Vol. 129. Number 6 DECEMBER, 1928 Price 25 Cents

AMERICAN GAS JOURNAL

Established 1859 Pioneer of the Gas Industry

Including · GAS INDUSTRY · Est. 1900 ·

Six Major Improvements

1 **Sprague Special Diaphragms**
Acid resisting, semi-chrome retanned leather

2 **Enclosed Top Bracket**
Protects and lubricates the worm and gear

3 **Improved Valve Cover**
Eliminates possible breakage in transit

4 **Raised Bosses on Flanges**
Eliminate seepage in wet gases

5 **Bronze Bushed Links**
Reduce wear and lost motion

6 **Improved Adjusting Tools**
Reduce shop costs

All designed to better the one and a half million Sprague Meters in Service

TO ALL GASMEN WE WISH

A Merry Christmas

THE SPRAGUE METER CO.

BRIDGEPORT CONNECTICUT

Library of Congress DEC 19 1928 Smithsonian Deposit

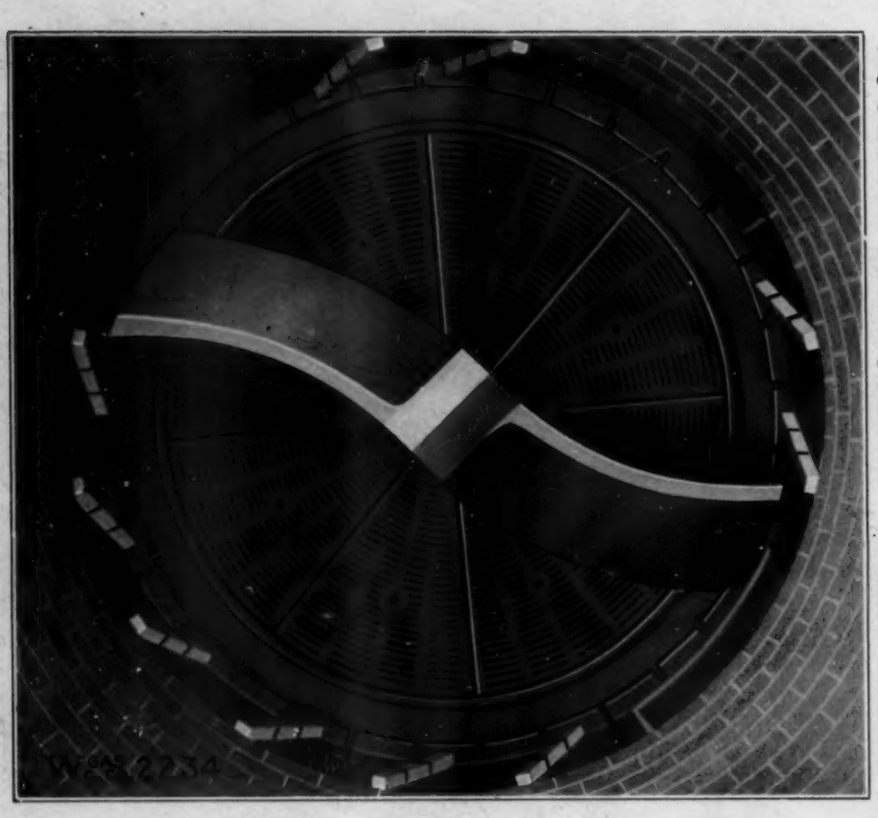
A Clean, Active, Uniform Fire Bed in Your Generators

This much-sought-for condition in your generators can be easily obtained with a consequent elimination of clinkering labor, reduced oil consumption, saving of fuel, low maintenance costs and the production of a higher grade of blue gas, if your machines are equipped with the

A-B-C SELF-CLINKERING GENERATOR BASE

The statement above is not based on theory, but from the result of over two years' continuous service under actual plant operation.

It's All in the Agitating Beam!



This hollow, water-cooled cast steel beam revolving in a horizontal plane over the grate, continuously and positively removes the ash and imparts in the lower portion of the active fuel bed a motion that insures each horizontal cross-section will be uniform in density and temperature.

Furthermore, this beam precludes the formation of large clinkers in the fuel bed and the clinkering of side walls and keeps the center of the fuel bed in a loosened, active condition.

A study of the accompanying plan view of Beam will give a faint idea of how the beam accomplishes this, but a complete descriptive catalog, which can be had for the asking, will describe its operation in detail and show many other unique advantages of the A-B-C Self-Clinkering Generator Base, that will result in big economies and increase the profit on the send-out.

It will pay you to write for further details

THE WESTERN GAS CONSTRUCTION CO.

FORT WAYNE, INDIANA

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900

Executive and Editorial Offices, 53 Park Place, New York City

S. G. KRAKE, *President and Treasurer* A. M. GLEASON, *Secretary*

H. M. RILEY, *Editor*

R. S. McBRIDE, *Consulting Editor*, Washington, D. C.

Vol. 129, No. 6 **December, 1928** Whole Number 3660

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AMERICAN GAS JOURNAL, December, 1928, Vol. 129. No. 6. Published monthly by American Gas Journal, Inc., at 34 N. Crystal St., East Stroudsburg, Pa. Executive, Editorial, and Business offices at 53 Park Place, New York, N. Y. Application made for entry as second-class matter, October 6, 1928, at the postoffice of East Stroudsburg, Pa., under the Act of March 3, 1879.

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H. T. MATTHEW, *Advertising Manager*, 53 Park Place, New York.
F. P. CURLEY, *Service Department*, 53 Park Place, New York.
NORMAN C. NOURSE, *Advertising Rep.* 681 Market St., San Francisco, Cal.

3,000,000 *Cu. Ft. 5 Lift Gas Holder*
Built for
The Nassau & Suffolk Lighting Co.
Long Beach, Long Island

77 Years of Service to the Gas Industry

THE

STACEY

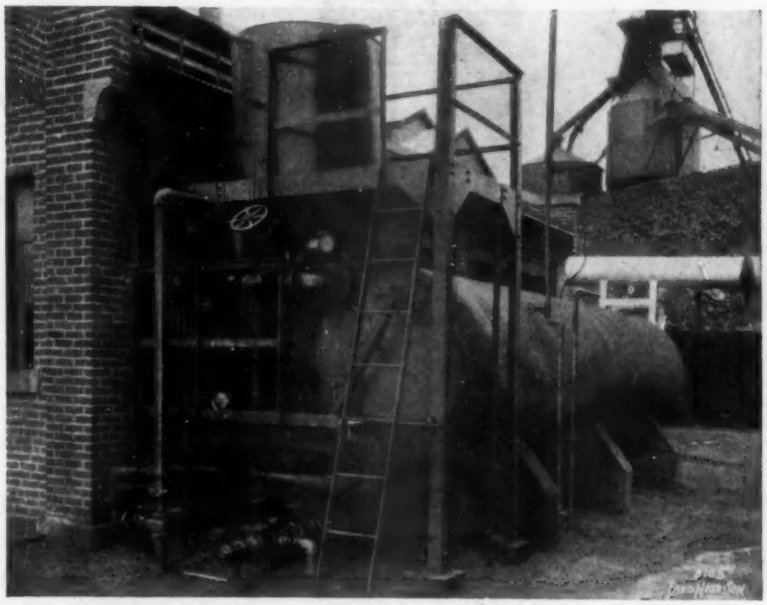
MANUFACTURING

COMPANY

CINCINNATI, OHIO

NEW YORK OFFICE
52 Vanderbilt Ave.

Treat Emulsion for 2½ Mills Per Gal.



The following is the statement of a gas plant superintendent for whom we recently installed a 5,000 gallon R S De-Emulsifier:

"We have treated emulsions here that contained as much as 65 per cent water and the following data are based on this emulsion:

Soda ash per batch	30 lbs.
Heating up period	2½—3 hrs.
Setting	12 hrs.
Water content finished tar	2—3 per cent
Steam cost per gal.	$0.00125
Labor	$0.0008
Soda ash	$0.00037
Total cost per gal.	$0.00242

"Of course a man does not have to be on the job during the heating up period except to see that the pressure does not build up to more than 65 pounds. The actual time a man has to spend to put through a complete batch is from 130—150 minutes.

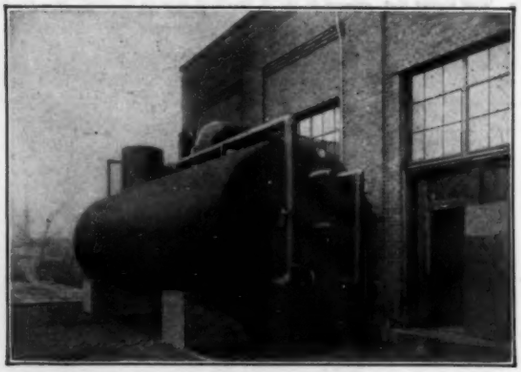
"The steam cost for the above data was taken at 30 cents M lbs. Labor at 60 cents an hour and soda ash at .0202 cents a pound."

We do not see how any plant can be without this effective and most economical method of treating water gas tar emulsions. The R S De-Emulsifier is made in three sizes to fit any local requirement. Send for full details of design and operation.

SEMET-SOLVAY
ENGINEERING CORPORATION
Division Allied Chemical and Dye Corp.
40 RECTOR ST. NEW YORK

28-3

Atlantic City Gas Co., Atlantic City, N. J., operated by The C. H. Geist Co. Installation 9 ft. x 30 ft. Smoot Steam Accumulator. The U. G. I. Contracting Co., Engineers.



28-4

Hudson Valley Coke & Products Co., Troy, N. Y., installation of 9 ft. x 30 ft. Smoot Steam Accumulator. Semet-Solvay Engineering Corp., Engineers.

SMOOT STEAM ACCUMULATOR

Smoot Steam Accumulators equipped with Smoot Control are installed in the gas plants of forty-two cities in nineteen states of the United States.

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Madison

SMOOT ENGINEERING CORPORATION
136 Liberty Street **New York**

SMOOT CONTROL

U. G. I.

MECHANICAL GRATE GENERATOR

for

CARBURETTED WATER GAS APPARATUS

COMPARE THE FACTS

Hand Fired Generator	*U. G. I. Mechanical Grate Generator*
Operation stopped for fuel charging.	Operation continuous (Charging time saved).
Hand charging inefficient and interrupts operating cycle.	Automatic charging at regular intervals without interruption of operating cycle.
Uneven fuel bed with hand charging.	Uniform fuel bed at all times.
Barring-down costly and destructive of linings.	No barring-down required and no linings to deteriorate at clinker zone.
Lessened efficiency of fire bed due to building up of ash and clinker.	Fire bed always in healthy condition due to continuous removal of ash and clinker.
Time lost and labor expense involved in shutting down and cleaning fires.	No time lost and no clinkering gangs needed as fire is automatically and continuously cleaned mechanically. Clinker ground up and discharged with ashes.
Good fuel lost with ashes or expense involved in reclaiming same.	Fuel lost with mechanical grate generator is negligible.
Capacity of set lowered on account of time lost in charging and cleaning fires.	Capacity of set increased on account of regular automatic charging and continuous cleaning of fire without shut-down.
Radiant heat of fire lost to atmosphere.	Radiant heat of fire used to produce steam in water jacket boiler.
Expense of shoveling and removing ashes after cleaning.	Ashes are collected in a bin and dropped periodically into industrial car or a conveyor.
Dirty generator room and operating floor. Hard labor under depleting conditions of intense heat and dirt.	Clean generator room and operating floor. Hard labor eliminated together with other poor working conditions.

THE U. G. I. CONTRACTING COMPANY

Division of

UNITED ENGINEERS & CONSTRUCTORS INC.

DWIGHT P. ROBINSON, *President*

PRINCIPAL OFFICE—PHILADELPHIA

CHICAGO ATLANTA

{ Reynolds }

Accurate and Efficient
Low Pressure Gas Control

Spring Type, Low Pressure Service Regulator

ADVANCED ENGINEERING, together with an actual knowledge of today's needs in the low pressure field, has placed REYNOLDS Low Pressure Governors far ahead of competition. Accuracy that is only rivaled by expensive electric controls—economy first at time of purchase, and later during operation—both are offered in Reynolds Low Pressure Regulators. This unit is characteristically Reynolds in operating simplicity and long dependability.

Many manufacturers have found it profitable to add this unit as standard equipment. This Regulator, operating on an inlet pressure up to one pound, will work from one-half inch to six inches outlet pressure. Our staff will be glad to co-operate. Write.

Reynolds Products

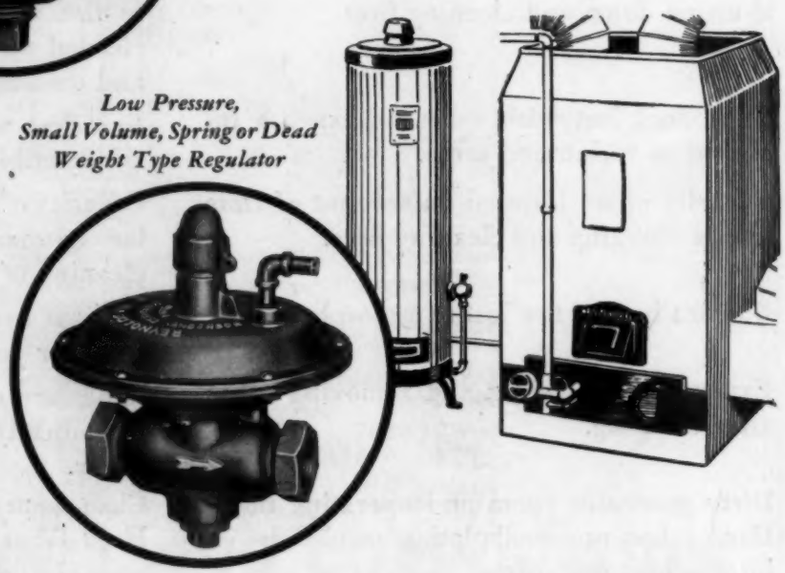
for all kinds of Pressure Reduction—for either artificial or natural gas.

Governors—
- Intermediate Pressure
- Triple Outlet
- Holder
- Toggle Type Street

Regulators—
- High Pressure Service
- Low Pressure Service
- Intermediate Pressure
- High Pressure Line
- Single and Double District Station

Valve—
- Automatic Quick-Closing
- Anti-Vacuum

Low Pressure, Small Volume, Spring or Dead Weight Type Regulator



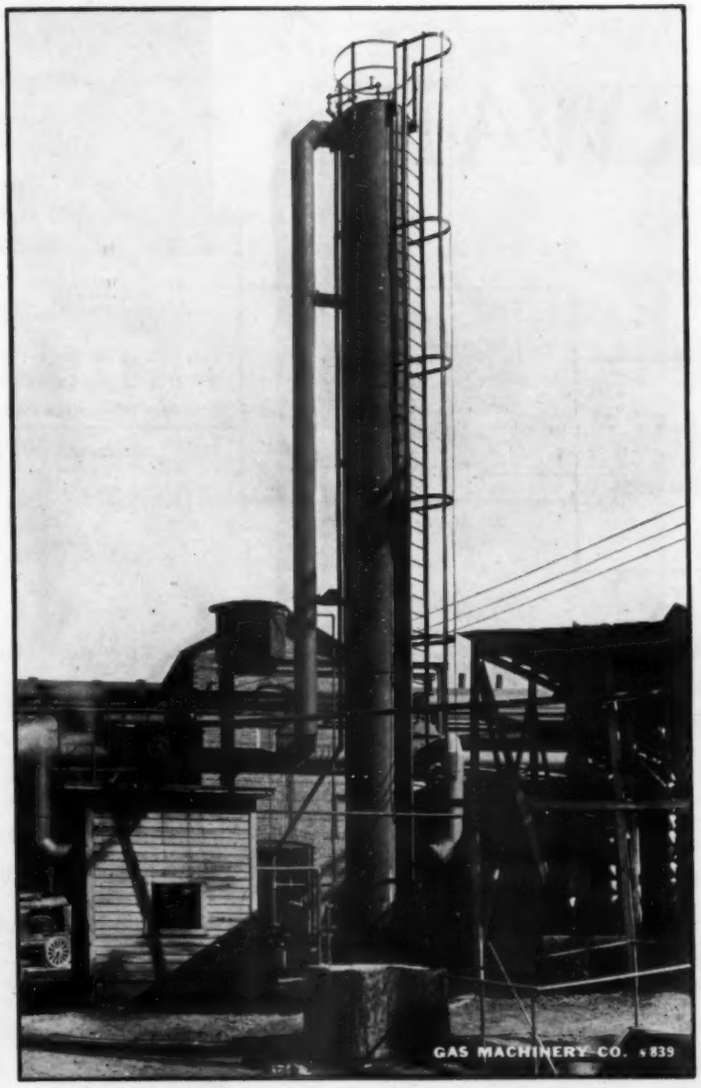
Reynolds Gas Regulator Company
Anderson, Indiana

REPRESENTATIVES

EASTERN SERVICE COMPANY, Boston, Mass.
THOS. C. CORIN, Detroit, Mich.
F. E. NEWBERRY, Avon, N. J.
GILLESPIE & SCHWAN, Inc., Dallas, Texas

Are You Having Troubles from Napthalene?

We Will Help You Solve Your Problems



Equipment Designed for Efficient Operating Service

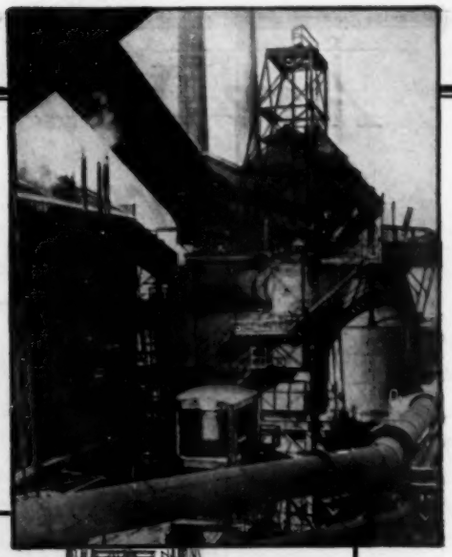
THE GAS MACHINERY COMPANY

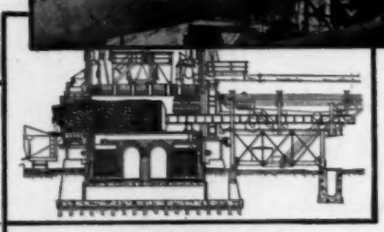
1900 Euclid Ave.,

CLEVELAND, OHIO

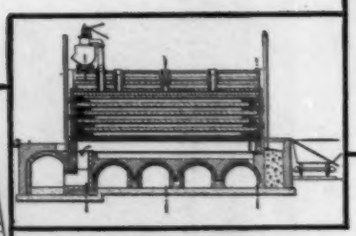
New England Office, 185 Devonshire St., Boston, Mass. Edwin E. Witherby, Representative

Another step FORWARD





REGENERATIVE OVEN



RECUPERATIVE OVEN

BEEHIVE OVENS

A THOUSAND pounds of high pressure steam is delivered per ton of coke cooled by the Sulzer Dry Quenching System—*from heat formerly wasted by wet quenching.*

A very attractive saving is thus secured and another wasteful practice in coke production eliminated.

The beehive oven produced coke but wasted all the gas and by-products.

The recuperative oven conserved the ammonia, tar and to some extent the oils and coal gas.

The regenerative oven reduced the waste incident to high waste gas temperatures.

Literature describing the Sulzer System will be sent to you upon request.

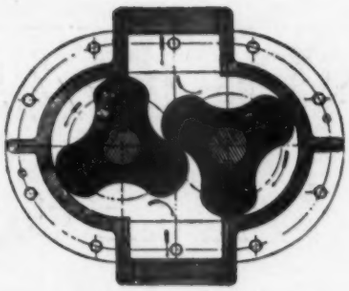
The Sulzer System for Dry Quenching coke is simple and dependable. The hot coke is placed in a special sealed quenching chamber. Inert gases are circulated in a closed cycle, by means of a fan, through the hot coke mass where they absorb the sensible heat of the hot coke and this heat is transferred to the water in the boiler circulation and converted into steam.

Dry Quenching Equipment Corporation

INTERNATIONAL COMBUSTION BUILDING

200 MADISON AVE. NEW YORK — N.Y.

A SUBSIDIARY OF INTERNATIONAL COMBUSTION ENGINEERING CORPORATION



Cycloidal Rotary Pumps

Not "just another pump" but a pump with a definite field of service. It is not built in the extremely small sizes for machine tool duty or individual oil burner service but, is supplied for capacities of 20 g.p.m. and greater. It is not recommended for high pressures but rather for low and medium heads.

The Cycloidal Rotary Pump is not a gear pump, for the impellers do not transmit power from one shaft to the other. Yet the action of the pump creates a positive movement of the liquids.

Simplicity in design, with few operating parts, all of ample strength, enables this pump to dependably handle viscuous liquids such as tar, oil, molasses, syrups, etc.

You will find in the by-product coke plants, the gas plants, oil refineries, chemical plants, sugar mills and also in the more general industrial plants, Cycloidal Rotary Pumps moving liquids in many processes.

More information about these pumps including the ratings of different sizes and styles may be obtained from Bulletin 19E. Shall we send you a copy?

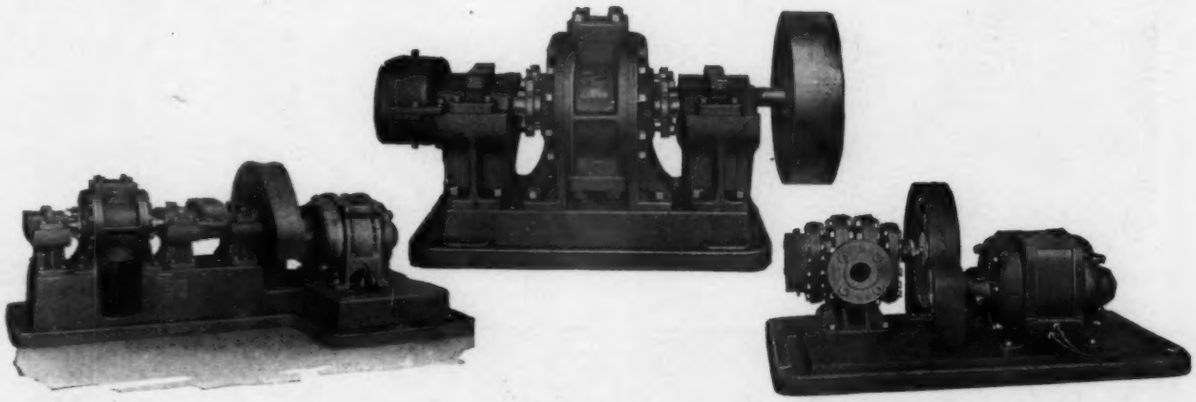
THE CONNERSVILLE BLOWER COMPANY

12th St. and Columbia Ave.
Connersville, Indiana

604 Chamber of Commerce Bldg.
Pittsburgh

1424 Monadnock Block
Chicago

114 Liberty St.
New York



CONNERSVILLE

Blowers • Gas Pumps • Meters • Cycloidal Pumps

"INDUGAS"

VERTICAL CHAMBER OVENS

With Water-sealed Drop Door
INTERMITTENT TYPE

Minimum Labor
Low First Cost

The annual operating reports of the Association of Swiss Gas Plants disclose that the "INDUGAS" ovens produce the largest yields of gas per ton of coal.

The following table shows the actual average yields from coal containing less volatile matter than the average American coal:

City	Time	Yield cu. ft. per net ton	Heating value B.t.u. (gross)
Baden, Switzerland	4 years average	14075	560
Olten, Switzerland	2 " "	13317	570
Friedrichshafen, Germany	4 " "	16045	515

There's a Reason

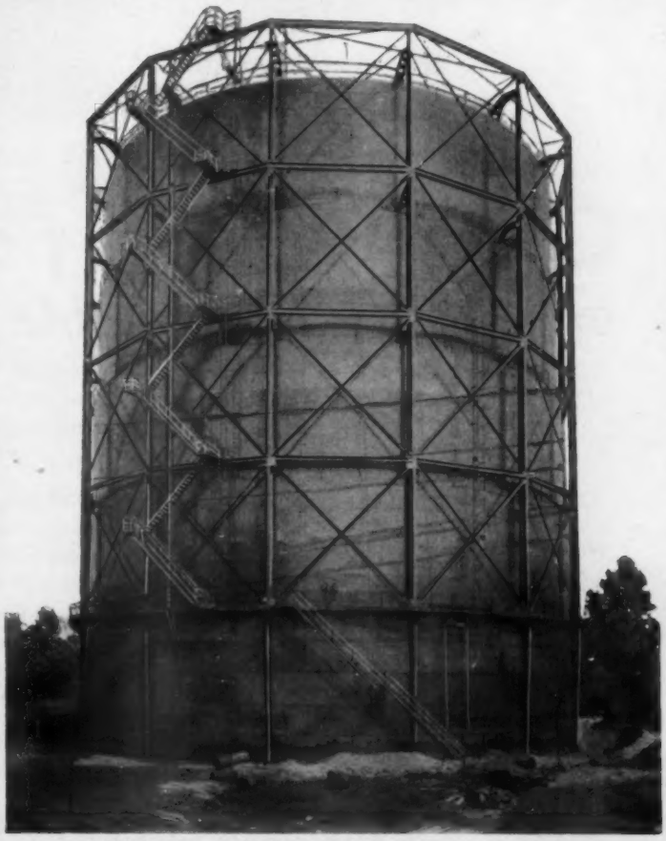
Full information, layouts and estimates gladly furnished

CARL STILL CORPORATION

114 LIBERTY STREET, NEW YORK

STURDY

CONSTRUCTION PAYS

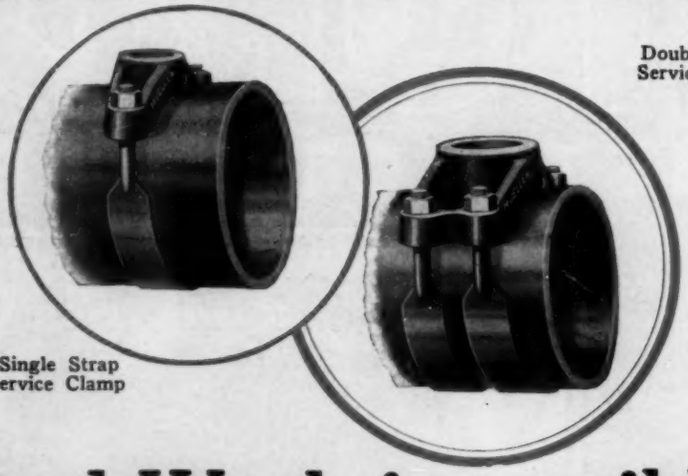


1,500,000 cu. ft. Holder erected at Norwalk, Conn.

INTEGRITY
FAIR C-K CO DEALING
SERVICE

CRUSE-KEMPER CO.
AMBLER, PA.
ENGINEERS & CONTRACTORS
BUILDERS OF STURDY GAS HOLDERS
PURIFIERS, SCRUBBERS, CONDENSERS, TANKS, ETC.

MUELLER SERVICE CLAMPS



Double Strap Service Clamp

Single Strap Service Clamp

Good Work is possible

only with Dependable Fittings

How to insure a dependable connection in old pipe, weakened by corrosion, or in lightweight pipe—Mueller Service Clamps offer the easiest and most practical way.

The single and double strap patterns are made of malleable iron. The Flexo patterns are cast iron because there is no breaking strain in making them fast. A good joint is assured by the heavy boss on all Mueller Service Clamps which permits a full depth of thread. Patented Lead Ring Gaskets are used on all but the largest Flexo pattern to prevent leaks between pipe and clamps.

Write for complete descriptions and prices.

Four Strap Flexo Service Clamps

Single Strap

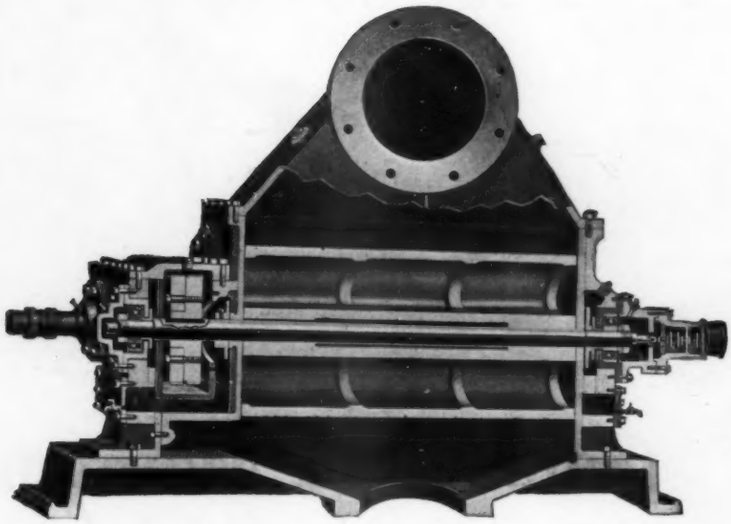
Double Strap

MUELLER CO. (*Established 1857*) **Decatur, Illinois**

Branches: **New York, Dallas, San Francisco, Los Angeles**
Canadian Factory: **MUELLER, Limited, Sarnia**

MUELLER

ROOTS



Accuracy in the Making

In the manufacture of the ROOTS Meter, Model SA, a high standard of accuracy is maintained at every operation. Step by step, the parts are made and assembled with the utmost precision and are carefully inspected. The extreme care of manufacture is, naturally, reflected in the finished meter. The ROOTS Meter, Model SA, gives the kind of long-lived performance that is expected of the finest quality, yet it is not too expensive for the smallest station. Its unqualified acceptance by the gas industry is the strongest evidence of ROOTS superiority. Write for details.

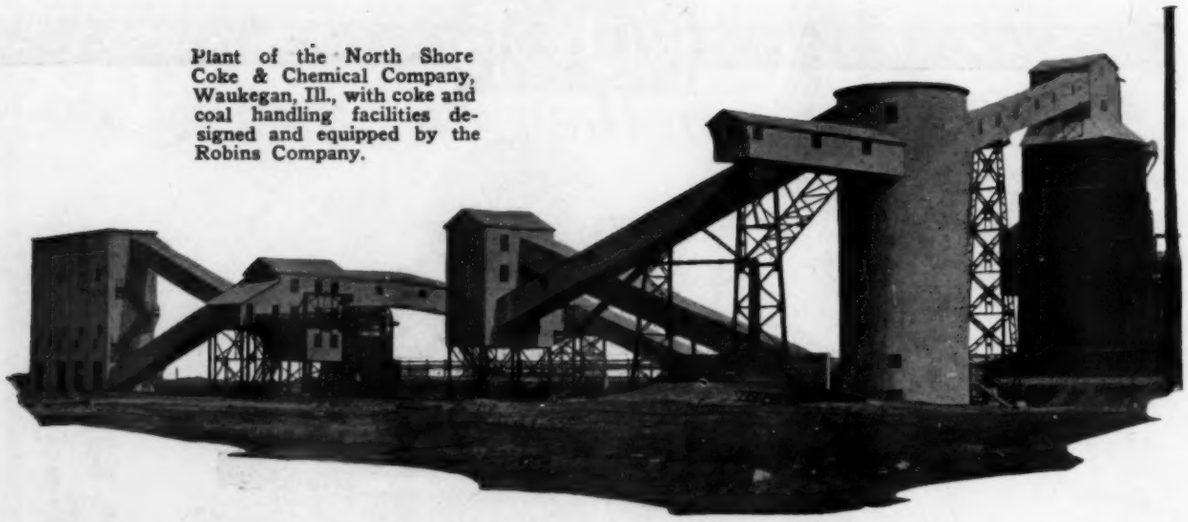
The P. H. & F. M. ROOTS CO.

CHICAGO
Peoples Gas Building

CONNERSVILLE, INDIANA

NEW YORK
120 Liberty Street

Originators of the Double Impeller Rotary Principle



Plant of the North Shore Coke & Chemical Company, Waukegan, Ill., with coke and coal handling facilities designed and equipped by the Robins Company.

Don't Gamble on Maintenance

SUPPOSING first costs are higher. What of it?

First costs for coal and coke-handling equipment fade in insignificance when maintenance costs begin to show up on the books. When you struggle along, patching up here, strapping together there, trying somehow to secure full continuous operations — that's when your maintenance costs become a deadly burden.

Don't gamble on maintenance! Insist first, last and always that the equipment offered will stand up day in day out under service, will require the least attention and supervision, will involve the least maintenance.

You don't jeopardize your profits, rather you protect them, when you buy from a company whose engineers insist upon high-grade machinery and high-grade workmanship.

Such engineers are with the Robins Company.

The Robins Company designs and makes a full line of coal and coke-handling equipment. Included are:

Conveyors
Belting
Idlers
Feeders and trippers
Crushers
Grizzlies
Intermediate Screens
Fine Screens
Gates

Coal Crushing, Storage and Handling installations

Coke Wharf Equipment
Metallurgical Screening Stations
Domestic Screening Stations
Coke Storage Equipment

ROBINS CONVEYING BELT COMPANY

NEW YORK CHICAGO

Boston Philadelphia Pittsburgh Los Angeles

Agents in other principal cities

Conveying and Elevating Equipment
Stocking and Reclaiming Systems
Crushing and Screening Equipment

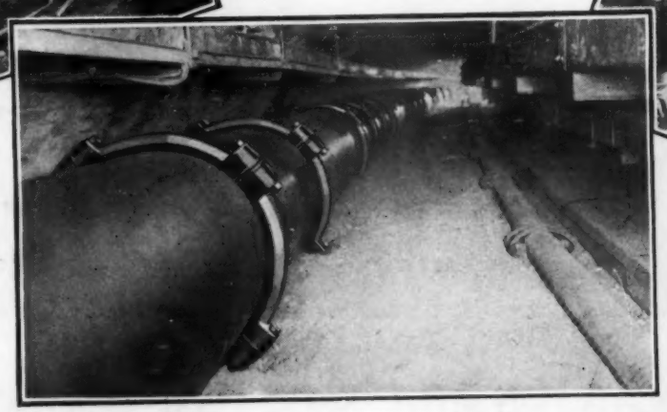
MATERIAL HANDLING ROBINS EQUIPMENT

Laying a Victaulic-coupled line through a Sumatra jungle

"For every joint on the line"

Unskilled Malays did all the work

48" water line in tunnel connected with Victaulic Couplings



View of completed Victaulic-coupled line in service

VICTAULIC COUPLINGS

Thirty-two kilometers of this 6-inch water line were laid with Malay labor, and without American supervision. It was later lowered into a ditch two feet deep and buried—while working under 300 pounds pump pressure—without a break or leak.

Victaulic Couplings can be successfully installed by primitive unskilled labor—and at less cost for time than any other type of joint.

Victaulic Couplings make it unnecessary to provide any special expansion joints and bends, because every Victaulic Coupling takes care of the contraction and expansion of the pipe lengths it connects.

For temporary or permanent lines Victaulic Couplings assure leak-proof joints that stay leak-proof under vibration, line sag or shifting the lines. They eliminate joint maintenance costs and will outlast the pipe they connect.

Victaulic Couplings are supplied in all sizes from 3/4 inch up for steel, wrought iron and cast iron pipe—for all pressures from vacuum to ten tons pressure per square inch. Victaulic Fittings make it easy to connect the line with any type of existing line.

VICTAULIC COMPANY OF AMERICA
26 Broadway New York

VICTAULIC DISTRIBUTION

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SMITH SEPARATOR CO.
Tulsa, Oklahoma

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Clarksburg, W. Va.

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Minnesota, Wisconsin
F. S. VAN BERGEN
Minneapolis, Minn.

New England
EASTERN SERVICE CO.
Boston, Mass.

Ohio
CASE HARDENING SERVICE COMPANY
Cleveland, Ohio

All purpose couplings

"For every joint on the line"

FLEXIBLE LEAK-PROOF
VICTAULIC
PIPE COUPLINGS

For list of uses and users and for detailed information on Victaulic Couplings, fill in and mail the coupon.

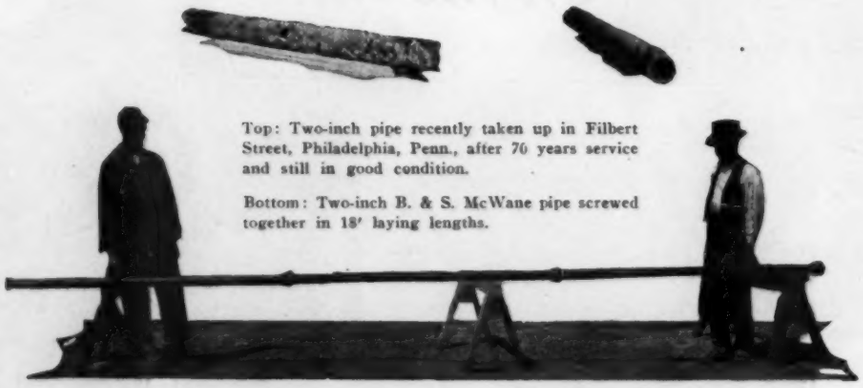
VICTAULIC COMPANY OF AMERICA
26 Broadway New York

Please send Victaulic Bulletin No. 7

Name .....

Address .....

FOR CRUDE OIL, GAS, WATER, SEWAGE, COMPRESSED AIR, etc.



Top: Two-inch pipe recently taken up in Filbert Street, Philadelphia, Penn., after 70 years service and still in good condition.

Bottom: Two-inch B. & S. McWane pipe screwed together in 18′ laying lengths.

Why You Should Say "McWane" When You Buy Small Pipe

McWane small diameter pipe is furnished with or without Precalked joints . . .lengths of 6′, 12′ or 18′ . . . is easily, simply and swiftly laid . . . can be tapped direct under pressure, without fittings.

McWANE is the largest manufacturer of small diameter cast iron pipe in the world . . . the only maker of 1¼″ pipe. McWane leadership in this field is not an accident. Years of research and specialization are back of it.

Small diameter cast iron pipe has been made for a century . . . witness the photographs above of Philadelphia pipe 70 years old and as good as new. But McWane pioneered the manufacture of this product on a commercial scale in the last decade.

It is consistent to use cast iron for service lines the same as for your mains . . . then your entire pipe system is permanent construction. The *cost per year* of cast iron service lines is far less than any substitute.

WRITE FOR ILLUSTRATED LITERATURE

McWANE CAST IRON PIPE CO. BIRMINGHAM, ALA.

PACIFIC STATES CAST IRON PIPE CO. PROVO, UTAH

SALES OFFICES IN PRINCIPAL CITIES

McWANE

CAST IRON PIPE

Extremely Compact and Light in Weight THE BABY DIGGER DELIVERS a Maximum trench footage in the toughest and hardest soils!

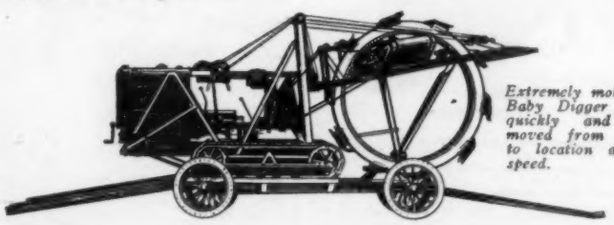
In the cities and suburban districts a great deal of your pipe is laid where working space is very limited. The Cleveland Baby Digger was built by practical men, experienced in trench construction, to meet just this condition and to eliminate expensive hand labor.

This little Trencher is very compact and weighs but four tons. The extreme width track to track is only 4 ft., 10 ins.; the over all length but 19 feet and the full height just 8 ft. 2 ins. Thus the Baby Digger can and does work efficiently, in parkways, between sidewalks and curbs, close to trees and poles and takes up but little room in the street.

Write for full details immediately and be set for efficient, economical, practical trench construction with the Baby Digger in 1929 and the years to follow.

Machine digging on this job saved many dollars but only the Baby Digger made it possible.

Note compactness and clean-cut Baby Digger trench at edge of sidewalk.



Extremely mobile The Baby Digger can be quickly and easily moved from location to location at truck speed.

THE CLEVELAND TRENCHER COMPANY

"Pioneers of the Small Trencher"

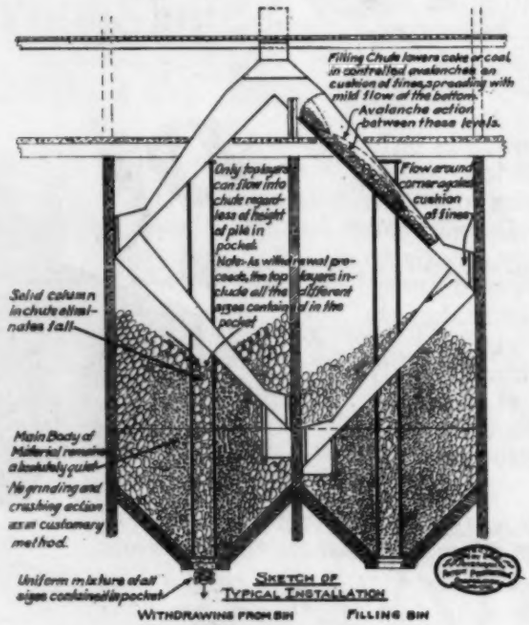
20100 St. Clair Ave. . . . . Cleveland, Ohio

THE BABY DIGGER

Coke and Coal Breakage Reduced Uniform Mixture of Sizes Assured *at the Same Time!* The ADAMS PATENTED PROCESS and CHUTES

The Result of Eighteen Years of Research and Study on Breakage and Segregation Problems

Nearly three years of use in various types of plants have proven the Adams Patented Process and Chutes to be one of the most beneficial improvements recently presented to the gas and coke industry.


Filling Chute lowers coke or coal in controlled avalanches on cushion of fines, spreading with mild flow at the bottom. Avalanche action between these levels.
Only top layers can flow into chute regardless of height of pile in pocket. Note—As withdrawal proceeds, the top layers include all the different sizes contained in the pocket
Flow around corner against cushion of fines
Solid column in chute eliminates fall
Main Body of Material remains absolutely quiet—No grinding and crushing action as in customary method.
Uniform mixture of all sizes contained in pocket
SKETCH OF TYPICAL INSTALLATION
WITHDRAWING FROM BIN
FILLING BIN

Both filling and withdrawing chutes are entirely self acting with no moving parts to get out of order. They can be designed for any type of bin or pocket.

Process and chutes patented, and patents pending.

Eliminate the greatest source of resistance to domestic coke sales.

Eliminate slugs of fines and insure a uniform mixture of sizes in watergas sets.

Entire cost returned in savings made in one year where any appreciable tonnage is handled.

We solicit an opportunity of stating what can be accomplished for you in your particular plant.

Patent rights controlled solely by

EATON–KENT INC.

Engineers and Manufacturers

Specialists in flow control and breakage reduction in the handling and storing of coke, coal and other friable materials.

Boat, car and truck loaders — **Storage bin discharge and withdrawal equipment**

17 ACADEMY ST., NEWARK, N. J.

This Pipe Resists Corrosion

THE Scale Free Process, applied to "NATIONAL" Pipe, butt-weld sizes ½ to 3-inch, makes this pipe resistant to corrosion because it actually removes one of the principal causes of corrosion, namely, mill-scale. This scale, which forms on the skelp in the welding furnace, is electronegative to the pipe metal and sets up galvanic action, causing pitting around the scale areas. Therefore, the scale being eliminated, the finished pipe is highly resistant to that form of corrosion known as "pitting" and insures added years of life to gas lines. Another advantage of scale free pipe especially important to the gas industry is freedom from loose scale—which means that small orifices and meters are unclogged and in good working condition.

This Scale Free Process, like the Spellerizing Process, is a patented feature, developed by National Tube Company—the details of which are given in Bulletin No. 7. A copy will be sent on request.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

District Sales Offices in The Larger Cities

The BARTLETT HAYWARD CO.

Engineers and Founders

BALTIMORE and NEW YORK

DESIGNERS AND BUILDERS OF:

Carburetted Water Gas Plants
Complete Coal Gas Plants
By-Products Plants
Salt Water and Fresh Water Condensers
De Brouwer Charging and Discharging Machines
Purifiers - Steel Tanks - Shaving Scrubbers
Vertical Waste Heat Boilers
Gas Holders

View of Main Plant, Located at Baltimore

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900.

HENRY M. RILEY, *Editor*

At This Season

AT THIS SEASON of the year over half the country's population will unconciously wish the American Gas Industry a hearty "Merry Christmas." In the graying dawn as the youngsters trip expectantly into the living room and the radiant gas heater sends out its friendly greeting of warmth and cheer, the housewife will be grateful for such comfort and convenience. And her feelings in this connection can well be construed as a message of good wishes toward the Industry which, for over a century, has kept the faith in rendering its customers service in the highest sense of the word. And hours later, when excitement has whetted the appetite as never before during the year, the festive bird will cook to a savory turn under the warm and economical persuasion of mankind's most perfect fuel. Likewise, "the flame that freezes" will crisp the celery and heat units of the *genus gas* will furnish a never-failing supply of hot water and keep the home at an even temperature.

THE PLEASANT THOUGHTS that the practical and satisfying uses of gas will engender in the minds of the people at Christmas time constitute one of the most valuable greetings that can be given to the Gas Industry. Or, if one would seek something of a more tangible nature, he has only to reflect that the Industry's customers on Christmas day will, in the great majority of cases, give the largest consumption of gas of any day in the whole year:—a gift of no small monetary value. The American Gas Journal also wishes the entire Gas Industry, from humble "gas-house terrier" to the Chairman of the Board, a richly merited *"Merry Christmas!"* Few, if any, institutions are more deserving of the greeting. And so,—as "Tiny Tim" observed, *"God bless us every one!"*

Feature the Trade Name

DURING THE past few months several gas companies have gone in for billboard advertising which appeals to us as being a splendid idea. However, it is a question as to whether these companies are taking full advantage of the copy used on the billboards.

In the August issue of the AMERICAN GAS JOURNAL, there is a reproduction of a billboard on gas refrigeration, but neither the name of the manufacturer nor the trade name of the appliance is embodied in the message to the public.

The manufacturers of gas operated refrigerators all employ a trade name for their particular unit. Further, these manufacturers are spending large sums of money in advertising their refrigerators through the popular magazines. In these media they particularly feature the trade names of their appliances. It seems logical then to suggest that, on billboard gas refrigeration advertising, the gas company include the trade name of the particular gas operated refrigerator which they are offering for sale. If such companies are selling more than one make of unit, they can include the trade name of each.

Most of the gas company customers read the popular magazines and those that are interested in refrigerators identify the one they are most interested in by the trade name. Therefore, if that trade name is included on the billboard, it cannot but add considerable effectiveness to the advertisement, because a prospective purchaser immediately on seeing the billboard on gas refrigeration, looks up the trade name of the refrigerator that she has become interested in.

We feel that this plan should also be followed out in the copy of gas companies in their advertising in the daily papers. The name of the company manufacturing the refrigerator need not be mentioned, merely the trade name.

Gas Plant Costs Should Include Capital Charges

GAS PLANT superintendents usually have as their main object in life, the lowering of operating expenses per M. As a consequence the plant executive often makes unwarranted recommendations regarding new equipment or plant accessory which he rightly claims will save operating expense. The fact which he overlooks, and which makes his recommendation faulty, is that the saving in operating expense is not sufficiently greater than the increased capital charge created by the new wanted device to justify the expenditure.

General management officials of gas companies are the ones fundamentally to blame in this situation. They hold the plant superintendent responsible for all elements of operating cost, and they constantly are treading on his heels in the effort to speed up his drive for better plant efficiencies. But they furnish him with merely the yardstick of operating costs, *excluding* capital charges. They talk of a net holder cost of 18 cents or 22 cents and gloat over any reduction even that expressed in the second or third decimal place of cents per M.

This is wrong. There is no real significance in a figure for net holder cost which excludes capital charges. This rather unorthodox statement can be clearly proven if one undertakes to calculate the cost of by-product-oven gas under such circumstances that the coke and coal markets bear a very favorable interrelationship. Under such circumstances the net holder cost of the gas may be made to appear almost zero, or even less than nothing in extreme cases. But to accomplish such a conclusion one ignores the 30 or 40 cents per M of capital charge.

It is high time that the industry began to speak about the cost of manufacturing gas in terms that will include operating expense *plus* capital charges *minus* operating credits for the sale of by-products. Such a basis for discussion is sound. Such a basis is one that could equitably be considered if making the gas for wholesale disposition. It would only be necessary to add to such a figure some profit for risk incurred and service rendered, in order to get the proper price at which to sell such gas commercially in wholesale fashion. It will be well if both individual companies and our association committees will give more attention in the future to this true cost figure, making it evident that the cost of capital is just as real as the cost of coal or the plant payroll.

Coal Gas Manufacturer—Optimist or Pessimist

THERE ARE all manner of funny-paper definitions of optimists and a like number of facetious descriptions of the pessimist. To this number we offer a new pair of definitions inspired by the recent address of Frank W. Steere on the theoretically perfect gas plant.

An optimist, according to our theory, is a coal gas manufacturer who thinks he is going to get $12 a ton f.o.b. his plant for coke without any sales' expense. Yes—you have guessed it—the pessimist is the fellow who expects less per ton for coke than he pays for coal.

But seriously, in this question of the coke market is to be found practically the whole crux of the problem of how fast we can extend the manufacture of coal gas for base-load city-gas supply. The enthusiasm exhibited at gatherings of coal-gas makers seems to be directly proportional to the prevailing market price for coke. This is a fact which must not be lost sight of when planning further extensions of base-load coal-

gas plants. This does not mean that such plants are unwarranted. It means merely that they should be installed only after adequate and dispassionate study of the market for the surplus coke.

Successful Elimination of the Unprofitable Customer

THE LEAST profitable customer connected to the gas companies' system is probably the apartment house dweller. This group regard gas merely as a convenience and, especially in large buildings of small apartments, use so little gas that they are merely a nuisance to the gas man.

In Chicago there has been a very aggressive effort for the elimination of such apartment dwellers as customers of the gas company itself. The move came first from the apartment house owners who saw a chance to buy gas at wholesale rates and resell it to their tenants at a profit. Some gas men have unwisely opposed this desire of the landlord. Not so Chicago! There it has been found that very frequently one or two or three large meters installed for the building as a whole will serve a group of one hundred or more apartments.

With a carefully planned rate schedule the landlord using these master meters is a profitable customer. The gas company has practically no problem in caring for the incidental needs of his apartment's users of gas. Often times these users get their gas free from the landlord, paying for it as a part of their rent just as they pay for the heat which they receive through the radiators. In all cases the result is the elimination of the great and growing problem of dealing with small users who inevitably on any practicable rate schedule are unprofitable customers unless they pay a substantial minimum service charge.

There should be greater emphasis placed upon this use of master meters. Through them there appears to be a partial solution of the profitless-customer problem.

Justifying New Equipment

THE GAS INDUSTRY makes and markets heat. Its prime object is the furnishing of energy in a convenient form for wide spread household and industrial application. Every means which contributes to the more efficient production of this marketable energy form has been welcomed by the engineer. However, there have been cases in which the gas company itself has made prodigal use of energy in its own works. One of the most flagrant examples of such plant waste has been in the failure to utilize the waste heat boiler to the maximum of its possibilities. Such conditions are, however, changing and the waste heat boiler as an adjunct of gas making seems to be becoming fashionable.

Not all gas plants can attain real economies by waste heat recovery. In some cases to conserve heat in this fashion would be to waste new investment. Hence the article on this subject in the present issue of the JOURNAL is particularly timely. It describes not only an effective method for testing a waste heat boiler installation for its technical performance; it gives also a clear interpretation of the results of such a test, both in terms of heat and in terms of dollar efficiencies.

A thorough study of fundamental engineering and economic relations affecting gas making is now in progress in the gas industry on a national scale. Every individual plant should make a similar effort applied specifically to its local problems, its local plant, and its local raw material. An accurate determination of all pertinent facts must be made by each company, since only with facts as to fundamentals is it safe to undertake to draw conclusions as to existing plant facilities or to formulate plans for enlargement, replacement, and maintenance.

"Defective Gas Heating Appliances Constitute Serious Health Hazard"

THE TITLE of this editorial is the title of a news item issued recently by the U. S. Bureau of Mines. It is a true but rather alarming way to put an important and needed warning to the gas-using public. Some gas executives may be disturbed by the title, or even by the text of the statement referred to. In fact, they should rightly be disturbed by some of the conditions actually prevalent in the homes of America where gas is carelessly used.

In the case described by the Bureau statement chronic headaches and discomforts were first thought to have resulted from carbon monoxide entering the apartments from the busy thoroughfare adjoining. The fact disclosed by investigation was that dirty and faultily adjusted gas ranges in the apartments were generating dangerous quantities of carbon monoxide. This case well illustrates how publicity regarding the dangers of automobile exhaust had struck home and suggested this possible source of hazard. But lack of similar understanding of gas appliance operation had failed to arouse any suspicion of the dirty cook stoves which were really at fault.

There is great need in handling this subject to make clear to the gas user that it is not the gas itself when properly used that is dangerous. Far more serious consequences come from improper use of gas and the escape of products of incomplete combustion than have ever resulted from unburned gas. Companies supplying either gas or gas appliances will do well to emphasize this fact. But every gas user must be taught that an appliance is safe only when properly adjusted and properly used.

Noted Home Service Director Builds Her Home Around a Gas Idea

Right—The Living Room with its cheery gas fire-place heater sounds a note of "welcome."

Above—A "Little White Home in the West" that utilizes the "gas" servant to the fullest.

Left—The kitchen with its gas range and gas refrigerator belies decadence in American home cookery.

My Little White Home in the West

By Anna J. Peterson

Director, Home Service Department, The Peoples Gas Light and Coke Company of Chicago

STRANGE as it seems on the face of it, the way we can become old on the job is to put so much time into it that we are absorbed to the point of selfishness, and it becomes a question what we owe ourselves as individuals who are selling our knowledge, what we owe our employer, and what we owe the community which we would serve. We find we must have new interests to fertilize the brain and keep it productive, if in turn we would grow in our job.

When I found myself at the point where I talked to my friends only about my job, I knew I needed to enlarge my experience and interest, and get at homemaking and gas in the home from an entirely different angle. I decided to build a house and equip it with every convenience which gas affords, so that I might give expression in truth and reality through actual experience to homemaking with gas.

Good Advice, This

I believe every employee who can should have the appliances for his home use, which he presents to the public, so he may speak with the conviction of actual experience. Information to be informative must be applied practically to the every day problems. I decided to build a house in sections and let that house grow as budgeted in the monthly salary check.

For years I had wanted a place to go in the summer that would be home where the flowers, grass and trees could be all my own. I had looked for just such a place, which would be fairly near good transportation, and offer the necessities for comfortable living, namely gas, telephone and electric lights.

Each morning when I left my home on the north side and waited on the "L" platform for my train I read that sign, "Come to the Fox River Playground," and finally I told a real estate woman, who was my friend, "If you want to sell me a home site, look up the Fox River Playground."

Within two days she was back saying, "I have found the place for you." And she had, for I purchased the 2-⅛ acres of wooded land, only 40 miles west of Chicago, and just a few hundred feet from an interurban station, which I now call my station.

The thrill of owning the land soon led to the desire of building my own house. Many dealers submitted their plans to me, and I decided on the little Harris New England type house. The lumber was sent out. The basement was excavated, and my vacation started. I lived in the open and watched my house grow.

The carpenters were jolly good fellows, and when I explained to them that if the kitchen could be the first room with walls and floors, so that the gas stove could be put in, there would be good coffee, stews, whole wheat bread, and nut muffins for us all, they made their hammers ring on the nail heads and no room in the house was finished so quickly.

With the gas stove was installed a gas light above it, so I always had plenty of light, and was not disturbed by the delay of electric wiring and the installation of fixtures. I have found this gas light a great convenience, for during the terrible electric storms, which have left my friends in darkness without even the comfort of the long ago candle for emergency, I have had light. My intimate association with gas and its efficiency has concentrated my mind on the good old slogan, "You Can Do It Better With Gas," and I have found it true, for in sunshine or in storm, it is always with me.

When I went to work again and returned at night from Chicago, I found the three carpenters waiting for me, with their marketing done, so that I might give each one of them orders what to do with their meat and vegetables. They lived in a tent and looked forward to this hot meal of the day. "Can you make a good stew?" "Mother used to make a meat pie with dumplings." It has been years since I had a real apple pie. Do you suppose you could make one?" These were some of the questions I had asked of me. During this time, while I was waiting for the house to be finished, I found great interest in seeing what had been done during the day, and in the new food desires from the men. Gas functioned even while the house was building.

When they left, having finished their part, the interest and joy still remained because of the new type of wall finishing and wood staining and painting which I proposed to do myself. Many questions have been coming into Home Service from the homemakers about just such rough walls and the care of wood surfaces, and now I had the chance to do it myself. Here was reality.

Back, Ahead of the Robins

The first of August the house was ready and my first guests arrived. September, with its cooling winds brought the time for closing, and I went back to the city, only to find that my city days were gone forever, and I could no longer live in an apartment. So strong was my craving to get back to my little house that the first of February I had the carpenter take off the storm protection from the windows and doors, and right then my little summer house became my all-year-round home.

It was the dead of winter, good old zero weather, and although I had a basement I had no furnace. This is where the good Radiantfire made it possible for me to heat a portion of my small house, and like a welcoming friend be ready to warm and cheer me when I came in at night.

For the first time in my life I realized how privileged I had been to go to the sink in my apartment and turn

on the hot water faucet and get all I wanted. Now I had to go to the outdoor pump for water and heat it on the stove. Talking to gas people, maybe it is incomprehensible to you to try and put yourself in my place.

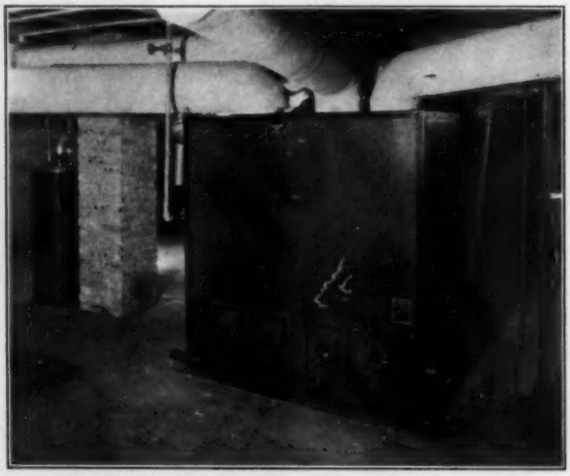
Gas heated water always on tap

That was my next step toward making my house a home. I installed an automatic pump and placed the order for the storage hot water heater. The only way I can describe the joy I felt the day I gave that order to the Gas Company, and came home to find hot water on tap, is to compare it with the delight I felt when a piano came into our house for my daughter. With this equipment a complete bathroom was a possibility, and it was my next step.

Now comes the joy, which banished forever the embarrassment of having people ask me, "Do you heat your own home with gas?" and "Do you have a gas fired refrigerator?" Final arrangements were made with the Western United Gas Company of Elgin, Illinois, for a complete installation of a gas fired furnace with thermostatic control. There is only one thing for me to remember in order to have a most comfortably heated house, and that is to wind the clock on the thermostat every eight days.

Right here everybody says, "What about the cost?" In round figures, taking into consideration all the inconvenience of a janitor, the time he is on the job and off, the wear, tear and breakage caused by careless indifference to your property, his salary and your nerves, it is not a large sum in exchange. I might be extravagant enough to say it is cheap.

The only thing my home now lacks to make it perfectly operated with gas is an incinerator, which will be installed next spring.



Of course, the house is gas heated

Edgar Guest says, "It takes a heap o' living to make a house a home," and I would like to change that thought to "It takes a heap o' knowing to make a house a home." That *knowing* can come to any individual no matter how meager are his surroundings, since the Gas Companies all over the country have welcomed him with "Ask Home Service anything you want to know."

TESTING INDUSTRIAL GAS MASKS

In order to stimulate manufacturers of industrial gas masks to make appliances of good quality, to improve their products, and to guide the consumer in purchasing safe masks, the Pittsburgh Experiment Station of the United States Bureau of Mines, Department of Commerce, makes examination of masks in accordance with a schedule of tests which is thought to cover the requirements of a safe device. If a particular mask fulfills these requirements, what is termed a Bureau of Mines "Approval" is issued to the manufacturer, and he is authorized to display and advertise that approval as a mark of quality of his product. The requirements that a mask must meet are the minimum thought to be compatible with safety. In testing, consideration is given to the following: (1) construction details; (2) the life or capacity of the mask to remove deleterious gases, as determined by passing known gas mixtures through the canister containing the absorbents and by men wearing the masks in highly contaminated atmospheres; and (3) deterioration on storage. The man tests are designed to be as severe as could be encountered. For example: in testing ammonia masks which are used in case of leaks in refrigerating plants, they are worn 30 minutes in an atmosphere containing three per cent of ammonia gas by volume. In testing masks for their capacity to protect against carbon monoxide, the man tests are also severe. The mask is worn 30 minutes in two per cent of carbon monoxide in air. Additional information describing the requirements and procedure of testing gas masks is given in Schedule 14-A and in Schedule 19. Copies of these schedules may be obtained through the Superintendent of Documents, Government Printing Office, Washington, D. C. The Bureau of Mines also publishes under the title, "List of Permissible Mining Equipment" a complete list of the masks which have been approved. The latest list is given in Information Circular No. 6077, July, 1928, obtainable from the United States Bureau of Mines, Washington, D. C.

Providing Gas Service For New Districts

By George Wehrle

Superintendent Gas Department, Public Service Company of Colorado, Denver, Colorado

THE matter of providing gas service to new districts is faced by gas companies in every growing community. It is a problem in many cases of extreme importance, which should be carefully studied and the extent of construction work to be done decided by sound economics and business principles.

Many gas companies operate under specific regulations or policies regarding the length of main or amount of construction expense allowed free to each new customer desiring gas service. These regulations or practices may be prescribed in franchises, or other permits to operate, or by company policy, but in accordance with sound business principles, a gas company should not be compelled to make an investment for supplying service to new customers greater than the amount upon which a fair return is derived from the customers' revenue. Any policy in deviation from this principle is not good for the gas company, nor is it best for the community served. Definite regulations or policies regarding extensions for new customers should be in force in every gas company and rigidly adhered to, in order to avoid discrimination between customers.

Changing Policies

Within the writer's experience of a quarter century in the gas business, have come many interesting experiences pertaining to extension work. Within this period of time the gas business has grown from an obscure business, dealing principally in gas for illuminating and cooking purposes, to one of the leading industries of the country, supplying heating service for domestic industrial and househeating purposes to three-quarters of the population of the United States. Naturally, through this evolution has come the necessity for changed extension policies.

At the beginning of the writer's career it was the custom to install mains and services, and even to install the appliances sold, free of charge. Gas rates were high and labor and material costs were low, so that the policy of free extensions and installations may have been sound in principle at that time. Increased business and changed conditions, involving gas rates and expense, however, have forced the necessity for careful attention to economic and business practices so that free installations promiscuously given to any customer applying for service is no more in vogue. We have seen unscrupulous promoters of real estate become deeply incensed at gas companies who refused to pipe their subdivisions or plots free of charge on the strength of prospective customers to be obtained for gas service in the years to come, and have tried many times to appease prospective customers who could not understand why the company was not willing to spend $5,000.00 to extend the main to supply them with $24.00 worth of gas each year. Many times we have been accused of being unscrupulous or inconsistent because we run John Jones a block of main free of charge to his new house back in 1900; whereas, we now only offer to run 100 feet free of charge and want a deposit for the balance of the construction cost involved. We have learned from experience that no matter what policy or regulation a gas company has in effect regarding extensions, any semblance of discrimination between customers will inevitably result in grief at a later date; whereas, the general dissemination of information and strict adherence to regulations and policies is a firm foundation upon which to build good public relations.

Determination of Regulations and Policies

Statistics of manufactured gas companies show that usually more than 50 per cent of all domestic customers are unprofitable and a large proportion of these are actually served at a loss. In one large and progressive company served at a loss, it was found that 28 per cent cent of the domestic customers used less than 1000 cu. ft. of gas per month and were obviously served at a loss to the company. How far, then, should we go to supply new customers when averages show that every other customer will be unprofitable? How are we to determine which are to be profitable customers and which unprofitable, and having so determined what are we going to do about it and still avoid discrimination? Herein lies a problem for executives to study in determining policies or bargaining for regulation. Proper forms of rate structure, wherein every customer pays his share of the expenses of gas service, would solve the problem for us, but we do not have that form of rate in general use as yet, and until we do, the matter of extension policies must be handled as a separate problem.

Knowing that on the average half of all domestic customers are unprofitable, we must therefore penalize the profitable ones somewhat in order that we will not discriminate against any in the matter of extension allowance. It must be determined, therefore, what amount of investment in new mains we can afford to put in for an average domestic customer, and this amount should be the free allowance for any customer applying for service where extensions into new districts are desired. This sort of policy, allowing a fixed amount of construction expense, or a fixed length of main, per customer, takes care of the average district, or the poorer district, but we will still be confronted with districts where the use of gas, and consequent rev-

enue, is considerably above the average. We can afford to be more liberal with such customers, but we must do so and still avoid discrimination. We can, therefore, have another step in our extension policy, similar to a step in our rates, to encourage increased consumption, whereby the amount of construction expense free to the customer is based upon the annual revenue to be derived from the customer when the amount of construction required per customer is over and above the minimum free allowance.

As an example of the above policy of free allowance for new extensions, suppose we have determined that we can afford to invest $50.00 in mains for every new customer desiring gas service. We establish this as the minimum free allowance, and any customer making application for gas service is entitled to that amount of free construction of mains to serve him, regardless of the amount of gas he may use. We hope, however, that his revenue will ultimately average $36.00 per year. We may have in a district desiring service customers who will pay us a great deal more than $36.00 per year. Perhaps they may desire to use gas for house-heating, in which case they may pay us as much as $200.00 per year. They are desirable customers and we want their business, but perhaps the amount of construction investment required is in excess of the allowance of $50.00 per customer and we cannot get the business on this basis. We, therefore, can afford to extend our policy, allowing any customer an amount of free construction equal to one and one-half times the annual revenue. We have, therefore, by this combined policy avoided discrimination and at the same time have made it possible to extend our mains to serve profitable customers.

Wording the Policy

A policy of this kind may be worded as follows:

"For domestic and small commercial service of permanent character, the Company shall install and maintain, subject to the Schedule, Rules and Service Regulations applicable, free of charge to applicant, the necessary gas meter and a gas service connection from its existing gas street main to abutting property line.

"For this class of service also, the Company at its sole expense shall install, if necessary, an amount of gas main construction equivalent in cost to one and one-half (1½) times the Company's estimate of the annual revenue from such applicant, but in no event less than one hundred (100) feet of ordinary gas main construction, or the equivalent of fifty dollars ($50.00) cost for each applicant when a longer extension or more than one applicant is involved. Where the total cost of the extension is in excess of the free construction specified above, applicants shall advance to the Company all costs in excess of said free construction allowance, which shall be subject to refund by the Company as follows:

"For each additional customer connected to the gas extension within a period of three (3) years after completion of said extension, where service has not been previously rendered, and where service connection only is required, a refund of fifty dollars ($50.00) shall be made, provided that in no case shall the refund exceed original deposit."

The matter of serving customers in new districts where the foregoing policies do not cover the entire cost of construction required, is obviously a liability of the customers. If they desire gas service under these conditions they should be willing to assist in financing the project by depositing with the Company the amount of money required over and above the free allowance in construction given by the Company. In such cases this deposit may be refunded to the customer, or customers, over a fixed period of time, in accordance with the free allowance policy in effect, as new customers are added to such extensions.

Building for the Future

If the extension policies described in the foregoing are in effect there need be no considerable worry about the future, since supply mains are provided only as needed to supply immediate customers. Naturally, the installation of feeder mains must be given some consideration as to future requirements, but even these need not be projected, as to size, very far into the future. No one knows how rapidly a new district will grow and many disappointments have been experienced in this direction. A policy of reasonable conservatism should be followed, since interest on unprofitable, or unused investments, compounds at an alarming rate, and it will usually be found economical to enlarge or add feeders from time to time as the load grows rather than to plan for the ultimate at the outset.

A definite system of pressure control requires knowledge of pressures carried at fixed points in a distribution system, and when such control is augmented by a system of continuous pressure survey in larger properties, and at least semi-annual surveys in smaller properties, the need for reinforcement of feeder mains will become known prior to the time their capacities are exceeded to the point of affecting service.

In the addition of large districts to a system it may be necessary to go back into the old part of the system and enlarge feeder mains, or if high pressure trunks are used it may require an additional governor station. In the enlargement of feeders, it will be found economical to use a system of tapering rather than to install a feeder of one size throughout. In such a system investment in feeders is made as the load grows which will, under ordinary conditions, be the most economical plan to follow.

Securing Customers and Carrying on the Work in a New District

Following is the method employed in Denver.

There are two ways in which the work of serving gas in a new district may be started—by solicitation or by petition. In the first case the gas company, believing that a certain district may be profitable, solicits the prospective customers; and, in the second case, the residents of the district petition the company for gas service, in which case the two plans coincide in the making of a survey of customers by a representative of the company.

At the time of making the survey bona fide contracts are secured which, of course, are voided in case the project does not go through. After all of the contracts possible are secured, they are turned over to the Engineering Department, with an estimate of the revenue to be derived. The Engineering Department makes a plan of the proposed mains and an estimate of the cost of construction. If a sufficient number of customers, or a sufficient amount of revenue is shown to cover the construction cost, in accordance with the established

extension policy, a local expenditure requisition is made out. If it is found that the number of customers, or amount of revenue, is insufficient, the New Business representative is notified and an endeavor made to secure a deposit from the prospective customers sufficient to cover the excess cost of construction. This deposit is prorated in equal amount among the applicants for service. If the deposit cannot be secured the contracts are voided, if it is secured, the local expenditure requisition is made out.

The local expenditure requisition contains in detail location, description of work estimated cost of construction and estimate of revenue and earnings. After official approval by executives, a Job Order is made out, which goes to the Construction Department for execution. Each Job Order carries a specific number, to which all expense is charged. Foreman's Report and Job Progress Sheets carry the actual costs of the work as it proceeds, and when completed these are returned to the Engineering Department, where a comparison is made with the original estimate.

Installation of Gas Services

The cost of gas services is not included with mains in estimating construction costs for new districts. The service is installed free of charge by the Company from the main to the property line of the street and a charge is made to the customer for the service from the property line to meter, in accordance with established schedules. Therefore, all service orders are individual and handled alike, regardless if taken from new or old mains.

Method of Surveying Suburban Towns or Large Urban Districts for Preliminary Estimation of Service Possibilities

Frequently there are suburban towns or communities, or rather large urban districts without gas service, which we may desire to survey and analyze possibilities for serving gas. In the preliminary study of such districts it is not desirable to excite the residents by contacting them until we are ready to actually solicit their patronage. Such cases are handled somewhat different from a normal extension, as previously described. These surveys are conducted in Denver by the Engineering Department and records are kept on file for every suburb adjacent to the city.

The first procedure is to make a spot map of the community. This is an accurate map upon which each building, or prospective customer, is spotted in exact location. Different colors are used, designating the class of dwelling as either good, fair or poor, and for commercial and industrial establishments. After the spot map is drawn up, an estimate of load requirements is made from the classifications by colors and a distribution system laid out. After this, estimates of investment and revenue are readily obtained, giving a fairly accurate idea of the economic possibilities of the situation, which can be acted upon at once in the manner perviously described for new districts, or filed for future use.

Handling Extensions for Large Industrial Customers

On account of the desirability of securing a profitable industrial gas load, gas companies should be free to negotiate contracts for necessary main construction with individual industries in whatever manner may be mutually agreeable to the company and the industry, in which case the policy outlined for domestic and small commercial customers need not apply.

Where the amount of construction cost involved in supplying industrial customers is large, the element of risk becomes a factor of importance and should be shared or borne by the customer, in which case a financial arrangement may be consummated whereby the customer advances all or a part of the construction cost to the company, which is refunded in a mutually satisfactory manner, but usually by the refund of revenue over a stated period. The net result of such a plan is that since the company in no event can make investment from earnings it must borrow the money required somewhere, and just as well from the customer as any one else. The advantage, however, lies in the fact that if the company borrows the money from any agency except the customer, it must secure the same by an issuance of stock, or otherwise, thereby assuming the full risk of repayment, regardless of revenue derived therefrom; whereas, if the customer advances the money, it should be secured by note, subject to repayment as revenues are received by the company from the customer. This is obviously a fair arrangement since the investment is of no value to the gas company unless it is used by the industry.

The matter of adoption of extension schedules and policies must necessarily vary with individual economic conditions of the community served. The foregoing is not intended to serve as recommended standards, but in general will serve as a guide for the development of policies. Ours is a legitimate business in every sense of the word, and we must conduct it on the soundest of economic principles, which involves extension policies as well as any other phase of the business.

THE ECONOMICS OF ILLNESS

How formidable an item illness is in the list of economic wastes is indicated in a bulletin on "Industrial Health Service" issued by the Insurance Department of the Chamber of Commerce of the United States.

An electric service company estimates the cost of illness at $28.50 per employee per year. Another manufacturer placed the loss for each employee at $125 a year. Estimates of loss of time due to illness range from 7 to 9 days per employee. A large store found that employees needing dental work, having uncorrected eye defects, being 15 per cent over or under weight or having defects commonly considered unimportant, lost 12 per cent more time than employees rated as class A who were free from these defects.

Experience has shown that much of the economic waste due to illness can be checked. "One store averaging 4,000 employees over a period of three years," the bulletin continues, "after installing medical supervision, according to their health records, showed a loss reduction in the second year as compared with the first of about 8,000 working days, or an estimated saving in wages and compensation alone of $29,094. The third year, when compared with the first year, showed a saving of 16,000 sick days. As a part of these total savings, a campaign against colds was followed by a reduction of 3,143 cases with a saving of 5,495 days giving an estimated reduction in lost wages of $16,814.70."

Faribault Gas Plant—General View, showing Coke Trestle

Vertical Oven Chosen in Order to Eliminate Plant Smoke Nuisance

By R. S. McBride,

Consulting Editor, American Gas Journal

SELDOM is a coal carbonizing plant chosen primarily because of its freedom from smoke nuisance. But this was definitely the case in Faribault, Minnesota, where the Northern States Power Company has erected a very interesting plant of Glover-West vertical retorts. Their choice of this particular system was based on their own company experience at Fargo, North Dakota, which had thoroughly convinced them that by such installation they could meet the very insistant demand and eliminate the threatened litigation in Faribault. This was based on the complaints of certain customers living near the works that the old horizontal retorts were a public nuisance because of the smoke and fumes produced. These complainants appear to be very well pleased with the operating results obtained in the new plant, thus amply justifying the judgment of the engineers of the company.

The new plant consists of two benches of four vertical retorts each, with appropriate coal and coke-handling equipment and gas-handling facilities. Coal crushed so that all of it will pass a two inch screen, is charged at from 5500 to 6000 pounds per day per mouthpiece, giving the plant a normal capacity of 24 tons of coal per day. One of the benches is so arranged that any one or more of the four retorts can be independently operated while the others remain inactive. The second bench is so arranged that either pair of two retorts is operable independent of the other pair. Thus the plant is very flexible in capacity, since the output can be increased or decreased by steps of one or two retorts at will, according to the current gas demand.

This flexibility also affords convenient opportunity for the scurfing of the retorts. This operation is accomplished by having a single retort out of operation and open to circulation of air by natural draft for approximately 24 hours at intervals of several weeks. The present operating practice requires that one retort shall be off for scurfing each 20 days. Under ordinary conditions six or seven of the eight retorts suffice to serve the company need, but at the peak-load seasons during the coming winter it is expected that the eighth retort will probably be operated also. Considerable flexibility in output can also be secured by varying the tempera-

tures and the rate of coal and coke movement through the retort. Hence the local management has no difficulty in meeting seasonal changes in gas requirements without the use of water gas.

Coal Handling

Coal is received at this works in hopper-bottom cars when it is desired to discharge it directly through the track hopper and adjoining skip hoist into the plant for current use. When the coal is intended to go into storage it is preferred to have it received in box cars from which it can be transferred by hand barrows into the adjoining stock pile on the other side of the track. The coal which is elevated by the skip hoist is crushed to the requisite size in a spike-roll crusher and drops into a two-compartment crushed coal storage bin. This divided bin provides facility for handling two kinds of coal and mixing of the coals for the oven charge, if this proves later to be desired. At present, however, the results being obtained with Elkhorn coal are satisfactory and mixing is not found economically desirable.

The crushed coal is dropped from the storage bins by gravity into a small coal wagon which is rolled by hand along its track over a track scale where it is weighed before it is run onto the plant elevator and raised to the desired level for dumping into the overhead coal storage bins. From these bins above the retorts coal is introduced into the charging hopper of each retort through a hand operated gate at invertals of approximately 90 minutes. The coal descends out of this charging hopper by gravity directly into the retort at a speed which is determined by the rate of coke withdrawal from the base of that retort.

Coke Quality Vital

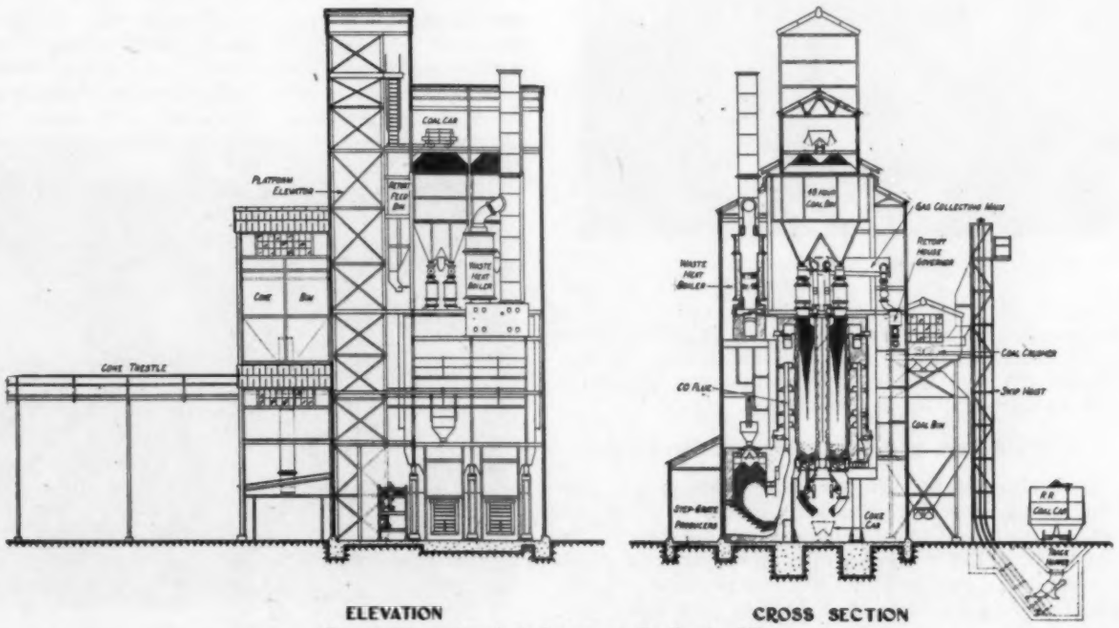
The coke market in and about Faribault has always been good; and successful operation of the Faribault works requires the making of a coke satisfactory to the customers in order to preserve this market on a favorable price level. Hence the selection of coal, the plant operating methods, and the coke handling are all very largely governed by these considerations. In fact, during the first six months after the plant was operating smoothly the engineers of the company devoted practically all of their thought to an investigation of the effect of operating conditions and of variation in coal on the coke quality, particularly the density of the coke. It is expected that the results of that investigation will be available to the readers of AMERICAN GAS JOURNAL through a full technical report to be published in an early issue.

As a result of these investigations the plant is now operated with a temperature range from 1900° to 2300° between the bottom and the top sections of the heating flues. It has also been determined that so long as the plant capacity permits it will be desirable to operate at considerably below the maximum rate of coking in order to give a denser stronger coke. The coke-discharge mechanism has, therefore, been set at considerably below the maximum speed.

Coke Handling

The discharge of the coke takes place continuously through a screw mechanism which is revolved part of a revolution in the base of the retort several times an hour. The warm coke thus discharged accumulates in the hot-coke hopper where it is subjected to a small water spray which assists in cooling and makes the coke dustless. The steam generated by the vaporization of this water from the hot coke passes upward through the retort and issts in the gas making. This use of water sprays in the coke discharge hopper makes any other steaming of the retort substantially unnecessary.

At intervals of approximately 90 minutes the cooled coke is dropped from the cooling hopper into the coke wagon which runs on the track directly below. This coke wagon is then pushed by hand onto the elevator and raised to the desired level for discharge. It may be emptied as run-of-retort coke into the storage bin beside the elevator and subsequently withdrawn either for screening or for charging the producer. Or it may



ELEVATION **CROSS SECTION**

Glover-West Vertical Ovens at Faribault, Minn.

Producer Side—Discharge Floor

be run off the elevator onto the track which runs along the coke trestle and thus be discharged into the unscreened coke storage pile.

The coke is reclaimed from this unscreened stock either by a portable yard wagon loader or by hand. Usually the coke so reclaimed is placed in the coke wagon, elevated to the run-of-oven bin and from thence handled through the screening station for sizing. In sizing the coke both egg or "furnace" and nut or "stove" size are made for the domestic trade. The pea size and fines are also sold for industrial boiler-plant use, except such breeze as is used in the gas-plant boilers.

Compressor Room

This company is fortunate in having a market even for the smaller sizes of coke. Hence, during the season when its own fuel-fired boilers are not required it is able to market all of its coke out-put.

Producers and Waste-Heat Boilers

The heating of the benches is by producer gas generated in indirect but attached producers which are fired with run-of-retort coke. The producers are charged from the trolley-operated coke car into which the coke is fed by gravity. Only one producer is operated at a time for firing both benches; the other is a spare.

The temperature of the settings is controlled by adjustment of the damper bricks at various levels and by the proportioning of primary and secondary air to the desired amounts, thus gaining the desired distribution of the combustion through the various passes around the retorts. The products of combustion from the top pass about the retorts goes directly into the waste-heat boiler. This unit supplies ample steam for all plant operations except during the coldest weather, when the heating requirements of the condenser house, the holder, and the meter and office building necessitate the running of one of the fuel-fired steam boilers of the plant.

Condenser Room

The steam lines which run from the waste-heat boiler to the other plant buildings are run close to the crude-gas line and are jacketed inside the same insulation. Hence the radiation from the two pipe lines is mutually conserved.

Gas-Handling System

Crude gas from the top of the retort passes by the overhead line just referred to into the condenser house. There in turn it passes through tubular primary condenser, exhauster, P and A tar extractor, secondary condenser and a pair of tower washers where direct scrubbing action takes place with sprays above

Discharge Side, showing Water Sprays

the grid filling. It then passes from the condenser building to the purifiers, thence to the Connersville meter which is housed in the small office building,aud finally into the plant storage holder.

This holder is of somewhat unusual character, because the tank section is altogether above ground and is housed within a tile structure which matches the other buildings in appearance. Heating of the tank is by the Crosby system, with circulation of hot water through an automatically thermostated system which is housed

Thomas Calorimeter

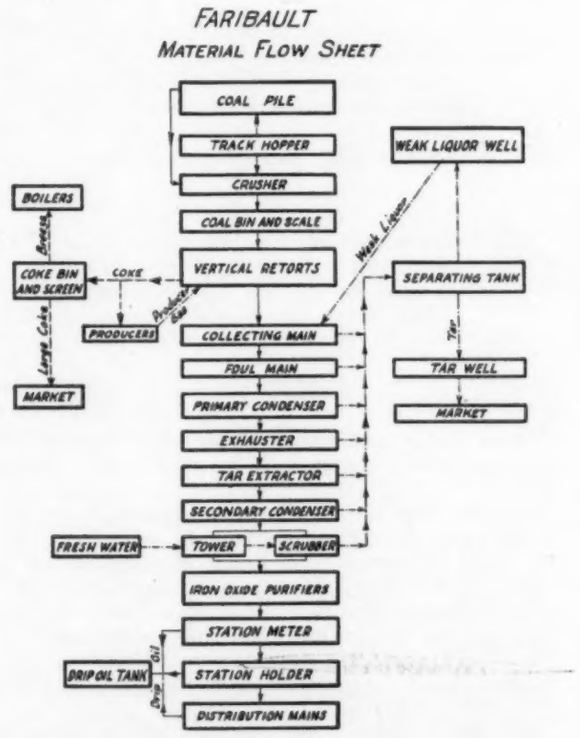
in the condenser building adjoining the holder. The extra cost of construction of the housing and of this holder heating system is believed by the local management to be much more than justified by the saving in steam required for keeping the holder from freezing in extreme weather.

Plant Efficiency

With the operating schedule now in force the plant requires a maximum of ten men, including the superintendent and three operators and three helpers, one of each on each shift. There are either two or three utility men who work on the day shift only, including those who do all of the yard work, coal unloading, coke screening and handling, and repair and maintenance work, including that of pipe fitting and other duties of the mechanics.

Charging Floor

There is approximately 50 per cent of the weight of the coal available as salable coke. From 14 to 16 per cent of the coal weight is found in the coke which goes to the producers. This corresponds to a bench-fuel consumption of 280 to 320 pounds per ton of coal processed. The gas yield ranges from 6.5 to 7 cu. ft. of city gas per pound of coal used, the gas being of 525 to 530 B.t.u.



per cu. ft. Because of the irregularities incident to initial operation and to frequent changes in coal supply during the period of experimentation it is not as yet practicable to determine the tar yields. No ammonia is recovered from this plant. The gas send-out serves not only the city of Faribault, but also, by a 14-mile high-pressure pumping line, the town of Dundas and the city of Northfield.

Comment on the Price of Ammonia

Editor,
American Gas Journal,
53 Park Place,
New Yory City, N. Y.
Dear Sir:—

I was much interested in Mr. Beebee's article "What Price Ammonia" in the September Journal.

In order to compare the returns from ammonia in the form of sulphate, as computed by Mr. Beebee, with

those from ammonia in the form of concentrated liquor, I have made a parallel computation of operating costs using the same price per 1000 lbs. for steam, the same price for lime, the same rates for labor and for repair parts, supplies, etc. as I calculate to have been used by Mr. Beebee.

I have included fixed charges on the cost of scrubbers, and on the larger concentrator, decanters, weak and strong liquor storage tanks, etc., with their foundations and buildings, which would be necessary where a sulphate plant is not included; for a plant carbonizing 800 tons of coal per day and producing 4000 lbs. of ammonia per day. The figures follow:—

	Per Lb. of Ammonia
(1) Production Costs	
Manufacturing Labor	.348c
Steam for Still and Engines	.932
Lime	.632
Repairs (also water and supplies)	.168
	2.080c
(2) Fixed charges on $109,000. @ 16%	1.19
(3) Sales Expense (including freight rate of 23-1/3c per 100 lbs. on liquor of 16-2/3% NH_3)	1.527
(4) Power for Scrubber Pumps	.103
	4.900c

Thus unless ammonia sells for more than 4.9c per lb. there is no profit in it (in the case under consideration).

I agree with Mr. Beebee that sulphate is not likely to go below $40.00 per ton; on the other hand, while the price for ammonia as liquor is a little better this year than last year, (the same is true of sulphate) it must be remembered that the synthetic ammonia plants have not yet gotten into their full stride and I look for a price much less than 4.9c per lb. for gas works ammonia when the synthetic plants are operating smoothly at full capacity.

Of course where a plant already has scrubbing and concentrating equipment of ample capacity there would usually be no justification for considering sulphate manufacture unless the price for ammonia drops further; but when a plant must install additional ammonia-recovery equipment, and certainly for new plants, the relative merits of sulphate and ammonia-liquor plants should be carefully weighed—and I would say that this is true even of quite small plants.

There are fully developed sulphate plants obtainable for even the smallest gas works. Small plants have been frequently installed in England. They are really a miniature type of the regular large so-called direct plants, but so placed and arranged that the boiler fireman or other workmen can tend to them just as they can tend to ammonia stills in small gas works.

While Mr. Beebee has clearly shown that, in the case he illustrated, there was a loss of $1.70 per ton even with $45.00 sulphate it is evident that the plant he was figuring on was extraordinarily costly, probably because of some local conditions. The operating costs also are high. It is frequently true that where a sulphate plant is installed as a unit of a plant designed for it, $40 sulphate will show a profit even for plants carbonizing as little as 250 tons of coal per day; again frequently where $40 sulphate will not show a profit, 5c ammonia will not show a profit.

It should be pointed out that I used proportionately high costs for plant and for operating when figuring the cost of ammonia as liquor, since I wished to make the figures properly comparable with Mr. Beebee's estimates.

Likewise I assumed only 5 pounds of ammonia per ton because Mr. Beebee's figure of 9 tons of sulphate per day is equivalent to only 5.6 pounds of ammonia per ton of coal; in practice 6.5 pounds is often recovered in sulphate plants.

Yours very truly,

W. I. Battin

INDUSTRIAL ACCIDENTS CUT BY SAFETY WORK, COUNCIL FIGURES SHOW

Although accidents last year showed an increase, the 1927 toll of approximately 95,500 deaths being about four per cent higher than the 1926, members of the National Safety Council are reducing the number of industrial fatalities in their shops and factories as is shown in the annual statistical compilation, which just has been made public, comprising a pamphlet covering the safety experiences of some 2,089 establishments in varied lines.

The eight facts of major importance that are revealed by the compilation are:

1. 20,089 establishments reported for 1927; 1,725 in 1926; an increase of 21 per cent.
2. In 1927, 1,565,747 persons worked 3,742,404,981 hours, while in 1926, 1,221,094 persons worked 3,033,416,031 hours.
3. A gradual decrease in the hours of exposure per man has occurred in the past three years. In 1927, 2,390; 1926, 2,480, and in 1925, 2,930.
4. 1927 average accident frequency rate equals 25.95. The average for two years previous equals 31.31; a reduction of 17 per cent.
5. 1927 average accident severity rate equals 1.88. The average for two years previous equals 2.50; a reduction of 24 per cent.
6. The ratio of persons employed to lost time injuries is 16 to 1. Days lost per injury equals 71. The ratio for two years previous equals 12 to 1, with 73 days lost per injury.
7. The ratio of non-fatal to fatal injuries equals 155 to 1. Ratio for two years previous equals 154 to 1.
8. 133 establishments, or 7 per cent of the total, completed the year of 1927 without a lost time injury. Represented in this group are, 8 Automotive, 12 Chemical, 29 Food, 13 Metals, 3 Packers and Tanners, 14 Paper and Pulp, 8 Power Press, 15 Public Utilities, 2 Quarry, 4 Textile, 10 Woodworking and Lumber Mfg., 15 Miscellaneous.

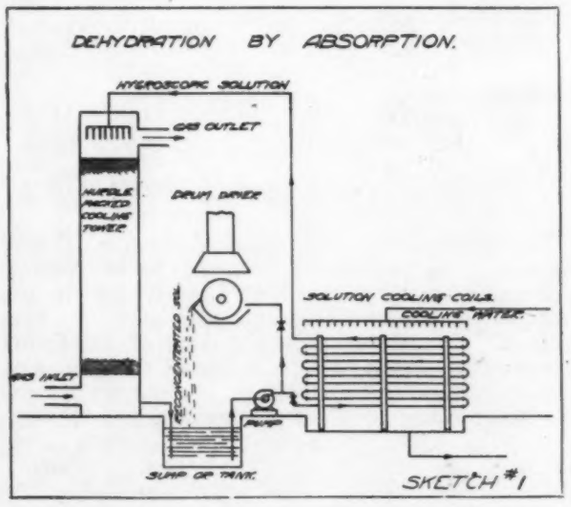
Reports were received from members engaged in the following industries: Automotive, Cement, Construction, Chemical, Food, Metals, Mining, Packers and Tanners, Paper and Pulp, Petroleum, Power Press, Public Utilities, Quarry, Rubber, Textile, Woodworking and Miscellaneous.

Cost of Gas Dehydration

Sub-Committee Under G. A. Bragg estimates costs by Three Systems for Typical Plant

The ultimate question in any engineering project is, What will it cost? Here is a splendid analysis which will enable any engineer to re-estimate for his local conditions very accurately the probable expense involved in serving dry gas.

The figures for the cost of gas dehydration in the following pages have been calculated for a typical small gas plant. The figures are given in such a way that it is hoped they can be easily modified to indicate the cost of dehydration under conditions varying from those chosen. The plant has a capacity of 5,000,000 cu. ft. per day of 525 B.t.u. gas saturated at 60° F. and 30". The dehydration plant will be located before the holder. The water seal of the holder will be covered with a 2" layer of gas oil to prevent resaturation of the dried gas. Cooling water is considered available at 2 cents per M gallon, steam at 50 cents per M lbs., electrical energy at 1½ cents per kw. hr. On this basis, electric power is charged for at 1½ cents per h.p.-hr., which makes an ample allowance for switchboard and motor losses. Each type of plant is assumed to require the same amount of labor, that is, one half of one man's time for 24 hours per day at 50 cents per hour.



In the summer time the gas will reach this typical dehydration plant saturated at 80° F. and is to be dried to a dew point of 55° F. The temperature of the available cooling water is 75° F. In the winter time the gas will reach this typical dehydration plant saturated at 60° F. and is to be dried to a dew point of 30° F., cooling water at 40° F. is available. The capital cost and operating charges for three different types of dehydrating plants are given.

Dehydration with a hygroscopic brine is ordinarily the cheapest and simplest way of drying gas. Sketch No. 1 shows a line drawing of a typical plant. The principal pieces of apparatus in this plant are: a hurdle packed scrubbing tower, in which the gas is scrubbed with the brine, pumps for circulating the brine over the tower, cooling coils for removing from the brine the heat due to the condensation of the water vapor from the gas, and an evaporator for driving off the condensed water from the brine. The simplest type of evaporator is a rack of pipes over which a portion of the brine is continuously circulated and through which steam is passed. The cost of such a plant complete with foundations and a small building for housing the pumps may be assumed to be about $35,000.

The daily cost of operation of this plant would be as follows:

Labor	
One-half one man's time at 50 cents per hour	$ 6.00
Power	
7½ continuous horsepower 180 h.p.-hr. at 1½ cents	2.70
Water	
175,000 gal. at 2 cents per 1,000 gal.	3.50
Steam—for Evaporator	
10,000 lbs. per day at 50 cents per 1,000 lbs.	5.00
Maintenance, Repairs and Supplies	5.00
Calcium Chloride	
14 tons per year at $25 per ton	.96
Fixed Charges	
13% per year of $35,000	12.47
Total cost per day	$35.63
Cost per M cu. ft. of gas	$ .0071

In making the above figures calcium chloride solution was used as the hygroscopic brine; this being the solution which is used in England and concerning which considerable data is available. It has been assumed that two complete changes of brine would be required each year. This takes care of losses of all kinds and permits renewal of the solution which will undoubtedly become quite dirty from such long use.

The above costs are for summer operation. During the winter the load on the plant would be less because less water has to be removed in drying the gas from 60° F. saturated to a dew point of 30° F. than from 80° F. saturated to a dew point of 55° F. Consequently less cooling water and steam are required and the cost of dehydration is less. This plant operating on gas saturated at 60° F. with cooling water available at 40° F. could actually dry the gas to a dew point of 20° F. at a lower cost than indicated above for summer conditions. The cost of winter operation with a 30° F. dew point would be as follows:

Labor	
One-half one man's time at 50 cents per hour	$ 6.00
Power	
7½ continuous horsepower 180 h.p.-hr. at 1½ cents	2.70

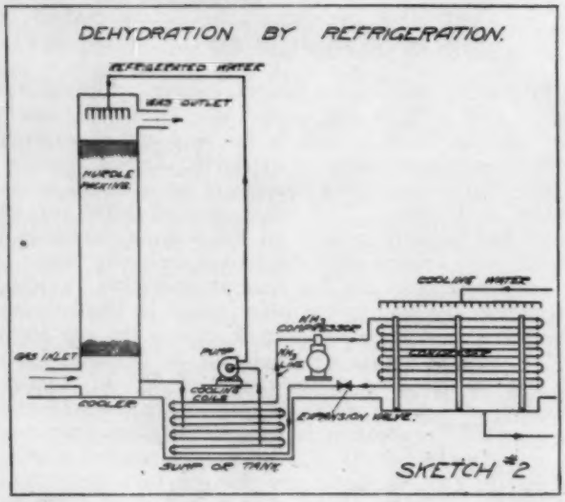
Abstract of Sub-Committee Report on Gas Dehydration presented at Tenth Annual Convention, American Gas Assn., Oct. 8-12, 1928

Water	
58,000 gals. at 2 cents per 1,000 gals.	1.16
Steam—for Evaporator	
7,000 lbs. per day at 50 cents per 1,000 lbs.	3.50
Maintenance, Repairs and Supplies	5.00
Calcium Chloride	
14 tons per year at $25 per ton	.96
Fixed Charges	
13% per year of $35,000	12.47
Total cost per day	$31.79
Cost per M cu. ft. of gas	$ .0064

DEHYDRATION BY REFRIGERATION

Dehydration by refrigeration involves the use of a refrigerating machine. Refrigeration of the gas may be accomplished by direct cooling with refrigerated water or indirectly by passing the gas through condensers, the tubes of which contain the evaporating refrigerant. No figures are available for the use of these indirect coolers.

Direct cooling of the gas with refrigerated water is very simple. It involves no new or untried types of apparatus. The possible dangers of corrosion which exist in the brine dehydration system are absent. On the other hand, dehydration by refrigeration involves previous substantially complete removal of napthalene. Further, it is not safe to refrigerate the water which is used, for cooling the gas much below 35° F. Consequently, the lowest dew point obtainable with this system is about 40° F., unless the gas is cooled under pressure



and allowed to reexpand. In the cost figures no charge is made for the removal ot napthalene previous to dehydration nor is any account taken of the fact that the lowest dew point obtainable is 40° F., whereas this limit does not exist when dehydration is accomplished either with brine or by compression.

Sketch No. 2 shows a line drawing of a typical plant. The principal pieces of apparatus in this plant are: a hurdle packed scrubbing tower, in which the gas is cooled with the refrigerated water, pumps for circulating the water over the tower and through the pump in which the ammonia expansion coils are located and a refrigerating machine with the necessary auxiliary apparatus, such as condensing, evaporating and cooling coils. The cost of such a plant complete with foundations and a building for housing the refrigerating machinery and pumps will be about $40,000.

The daily cost of operation of this plant will be as follows:

	Coal Gas	*Water Gas*
Labor		
One-half one man's time at 50 cents per hour	$ 6.00	$ 6.00
Power		
45 continuous horsepower 1,080 h.p-hr. at 1½ cents	16.20	16.20
Water		
150,000 gals. at 2 cents per 1,000 gals.	3.00	3.00
Maintenance, Repairs and Supplies	5.00	5.00
Anhydrous Ammonia		
1,300 lbs. per year at 14 cents per lb.	.50	.50
Condensation Loss		
water gas only	—	11.42
Fixed Charges		
13% of $40,000	14.25	14.25
Total cost per day	$44.95	$56.37
Cost per M cu. ft. of gas	$.0090	$.0113

The above costs are for summer operation. During the winter the load on the plant will be less because less water has to be removed when drying the gas from 60° F. saturated to a dew point of 40° F., than from 80° F. saturated to a dew point of 55° F. If this plant is operating on gas saturated at 60° F. with cooling water available at 40° F., it could dry the gas to a dew point of 40° F. at the cost indicated below.

	Coal Gas	*Water Gas*
Labor		
One-half of one man's time at 50 cents per hour	$ 6.00	$ 6.00
Power		
35 continuous horsepower 840 h.p-hr. at 1½ cents	12.60	12.60
Water		
110,000 gals. at 2 cents per 1,000 gals.	2.20	2.20
Maintenance, Repairs and Supplies	5.00	5.00
Anhydrous Ammonia		
1,300 lbs. per year at 14 cents per lb.	.50	.50
Condensation Loss		
For water gas only	—	11.42

Fixed Charges		
13% of $40,0000	14.25	14.25
Total cost per day	$40.55	$51.97
Cost per M cu. ft of gas	$.0081	$.0104

An absorption type refrigerating machine may be less expensive than the compression type machine for use in dehydration by refrigeration, if exhaust steam or some other source of heat is available at little or no cost. Of course, this condition rarely exists, but where it does the indicated cost for dehydration in this way is about the same as that for brine dehydration. It should be remembered, however, that dehydration by refrigeration assumes the previous removal of napthalene and that the minimum dew point obtainable is about 40° F. These two limitations do not exist in the case of brine dehydration.

The plant is similar to that shown on Sketch No. 2, save that the absorption refrigeration apparatus is substituted for the compression apparatus. The absorption apparatus consists essentially of a generator, a condenser, a refrigerating water cooler, an absorber, a weak liquor cooler and a pump.

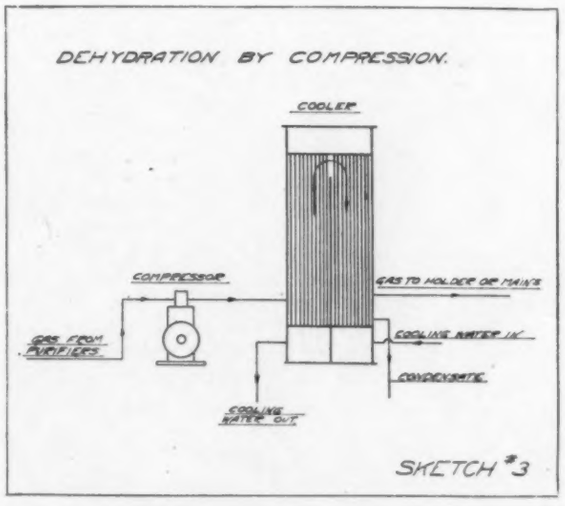
The cost of such a dehydration plant complete with foundations and a building for housing the refrigerating machinery and pumps will be about $47,000. The daily cost of operation of this plant under summer conditions, exclusive of the cost of exhaust steam, will be as follows:

	Coal Gas	*Water Gas*
Labor		
One-half of one man's time at 50 cents per hr.	$ 6.00	$ 6.00
Power		
5 continuous horse power 120 h.p.-hr. at 1½ cents	1.80	1.80
Live Steam		
2,000 lbs. at 50 cents per 1,000 lbs.	1.00	1.00
Exhaust Steam		
27,000 lbs.	no charge	
Water		
305,000 gals. at 2 cents per 1,000 gals.	6.10	6.10
Maintenance, Repairs and Supplies	5.00	5.00
Anhydrous Ammonia		
1,300 lbs. per year at 14 cents per lb.	.50	.50
Condensation Loss		
For water gas only	—	11.42
Fixed Charges		
13% of $47,000	16.75	16.75
Total cost per day	$37.15	$48.57
Cost per M cu. ft. of gas	$.0074	$.0097

The live steam is used for the refrigerating machine pump.

The winter cost on the same basis will be somewhat lower as indicated below:

	Coal Gas	*Water Gas*
Labor		
One-half one man's time at 50 cents per hour	$ 6.00	$ 6.00
Power		
5 continuous horse power 120 h.p.-hr. at 1½ cents each	1.80	1.80
Live Steam		
2,000 lbs. at 50 cents per 1,000 lbs.	1.00	1.00
Exhaust Steam		
13,000 lbs.	no charge	
Water		
100,000 gals. at 2 cents per 1,000 gals.	2.00	2.00
Maintenance, Repairs and Supplies	5.00	5.00
Anhydrous Ammonia		
1,300 lbs. per year at 14 cents per lb.	.50	.50
Condensation Loss		
For water gas only	—	11.42
Fixed Charges		
13% of $47,000	16.75	16.75
Total cost per day	$33.05	$44.47
Cost per M cu. ft. of gas	$.0066	$.0089



DEHYDRATION BY COMPRESSION

Many operating companies already obtain some dehydration by compression. Dehydration to the dew points specified, where compression serves no other purpose than dehydration, is more expensive than the other methods. Where some compression is necessary for

distribution, dehydration may often be reasonably obtained by an increase in the pressure to which the gas is compressed. The cost of this additional compression has been calculated for two cases: the first when the gas is compressed to 15 lbs. for distribution and the second to 30 lbs. For summer conditions in a typical plant, it is only necessary to compress the gas to 21½ lbs. gauge, that is, gas entering the compressors saturated at 80° F. and leaving them at the same temperature and 21½ lbs. gauge pressure will, when expanded to atmospheric pressure at 80° F., have a dew point of 55° F. For winter conditions it is necessary to compress the gas to 33½ lbs. gauge, that is, gas entering the compressors saturated at 60° F., and leaving them at 60° F., and 33½ lbs. gauge will have a dew point, when expanded to atmospheric pressure at 60° F., of 30° F. Thus a plant which is already compressing to 15 lbs. will have to alter its equipment for compression to 33½ lbs. In most plants this will mean new compressors. The cost of such a compressor plant without buildings, but including foundations, is about $40,000. This figure is used for computing fixed charges where gas is already being compressed to 15 lbs. In such a plant the old equipment would have some scrap value, depending upon the conditions at the plant. No allowance has been made for the scrap value of the old equipment. This allowance will have to be made for each particular plant by some one thoroughly familiar with the local conditions.

In cases where distribution already requires compression to 30 lbs., it is apparent that no additional equipment will be necessary to obtain the compression to 32½ lbs., which is necessary for dehydration. Hence, in the cost set-up for these conditions there is no capital cost. In each case cooling water will be required and it is assumed that enough will be used so that the gas will leave the after-coolers at the same temperature that it entered the compressors. The cost of after-coolers is included in the cost of the compressor plant necessary for 33½ lbs. compression. It is assumed that after-coolers are already in use in the present 30-lb. compressor plant. It must be continuously borne in mind that compression to the pressures here indicated will result in a final dew point the same as that obtained with the other systems only when the gas is expanded to atmospheric pressure. This compression will not prevent condensation of water in the high-pressure distribution mains unless the temperature in the mains is as high as that at which the gas leaves the after-coolers. This latter is rarely, if ever, the case. It should be further noted that the other types of dehydration plants were located before the holder so that they could be operated continuously at a high percentage of their rated capacity. Ordinarily, compression plants will be located after the holder and will have to be large enough to care for the peaks in the send-out. This will usually mean that the compression plant will be twice as large as if it could be located before the holder. No account has been taken of this in fixing the capital cost of the compressor plant nor has allowance been made for a spare or standby compressor. The compressor plant, the cost of which is used, would be large enough to handle 5,000,000 cu. ft. per day operating 24 hours per day.

Present Distribution at 15 Pounds

The additional daily costs of operation for compression to 33½ lbs. would be as follows:

	Coal Gas	*Water Gas*
Labor		
No additional charges		
Steam		
The compressors will be driven by steam condensing at 26" vacuum, 16 lbs. of steam per h.p.-hr., 48,000 lbs. per day at 50 cents per 1,000 lbs.	$24.00	$24.00
Water		
200,000 gals. at 2 cents per 1,000 gals.	4.00	4.00
Maintenance, Repairs and Supplies	1.00	1.00
Condensation Loss	2.48	5.15
Fixed Charges		
13% of $40,000	14.25	14.25
Total cost per day	$45.73	$48.40
Cost per M cu. ft. of gas	$.0091	$.0097

These costs are for winter operation. During the summer the load on the 15-lb. plant would be less because it is only necessary to compress to 21½ lbs. gauge to lower the dew point to 55° F. as previously indicated. Under summer operating conditions the additional daily cost of operation for this plant would be reduced from the previous figure and would be as follows:

	Coal Gas	*Water Gas*
Labor		
No additional charge		
Steam		
23,000 lbs. per day at 50 cents per 1,000 lbs.	$11.50	$11.50
Water		
80,000 gals. at 2 cents per 1,000 gals.	1.60	1.60
Maintenance, Repairs and Supplies	1.00	1.00
Condensation Loss	.81	1.55
Fixed Charges		
13% per year of $40,000	14.25	14.25
Total cost per day	$29.16	$29.90
Cost per M cu. ft. gas	$.0058	$.0060

Therefore, averaging the costs for summer and winter conditions, it may be stated that the additional expense chargeable to dehydration by compression of a gas already being distributed at 15 lbs. pressure will be about $.008 per M cu. ft.

Present Distribution at 30 Pounds

The additional daily cost of operation of this plant would be as follows:

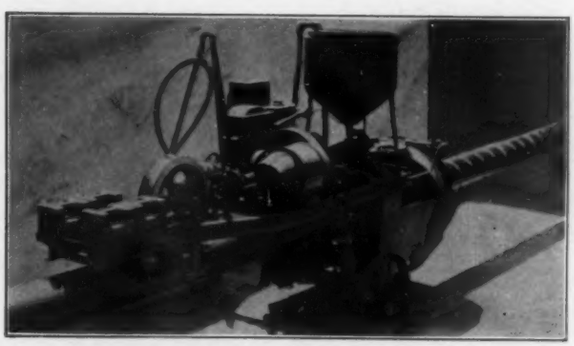
	Coal Gas	*Water Gas*
Labor		
No additional charge		
Steam		
7,300 lbs. at 50 cents per 1,000 lbs.	$ 3.65	$ 3.65

Water		
28,000 gals. at 2 per cent per 1,000 gals.	.56	.56
Maintenance, Repairs and Supplies		
No additional charge		
Condensation Loss	.66	1.20
Fixed Charges		
No additional charge		
Total cost per day	$ 4.87	$ 5.41
Cost per M cu. ft. of gas	$.0010	$.0011

These costs are for winter operation. During the summer there would be no charge for dehydration as the compression necessary for distribution is more than sufficient to obtain the necessary dehydration. Thus the average all-year expense would be approximately $.0005 per M cu. ft.

NEW DEVICE APPLIES PIPE COVERING TO OIL OR GAS PIPE LINES WITHOUT REMOVING THE PIPE FROM THE TRENCH OR WITHOUT TAKING THE PIPE LINE OUT OF COMMISSION

The accompanying photo shows a machine that has recently been perfected for applying pipe covering on installed pipe lines which lines must remain in service while being retreated. This machine will prove to be of great value, as a large part of the work of pipe protection has to do with retreatment of lines which have been in the ground several years,—in nearly every case the lines must remain in service while being retreated. For this work the application of coating, such as pipe enamel, and hand wrapped covering have so far been the only possibilities. The new machine duplicates in every particular the work done by the portable wrapping machine. It is especially intended for covering long lines of welded gas pipe or screwed lines. The parts of the machine which encircle the pipe are split, somewhat after the fashion of a split pulley; which permits the machine to be moved past valves, flanges or short radius bends by merely removing a few bolts.



Note rubber tired wheel which propels machine along pipe

The machine is operated by electric motors, electricity for which is generated by a generator mounted on a motor truck which accompanies the pipe covering machine, a cable connecting the generator with the electric motor.

The machine is moved forward by means of two rubber tired wheels which engage the top of the pipe as shown by the arrows. It is also equipped with two wheels one operating on each side of the trench.

The machine is equipped with an electrical heating element for heating Floatine which has preservative and adhesive qualities. This is applied to the pipe just ahead of the wrapping material which is known as Pabco pipe covering, and causes the pipe covering to adhere to the pipe.

Three men working on the Pipe covering machine and two men on the truck carrying the electric generator will complete from 800 to 1000 feet of pipe wrapping per day.

MEASURING THE TEMPERATURE OF FLAMES

Flames produced by the combustion of gases and vapors are used in many industrial operations; they cook our food, heat our houses, and even furnish motive power for our automobiles. The efficiency of flames in doing their work is often related closely to their temperature, but up to the present time there have been few actual measurements of the temperature of such flames. The flame laboratory of the Pittsburgh Experiment Station of the United States Bureau of Mines is making direct measurements of the temperature of flames in connection with a study of the physics and chemistry of combustion and explosion. It has been found that the brightness of a flame colored yellow with sodium chloride vapor is directly proportional to the flame temperature and in the method employed at the Bureau of Mines laboratory the intensity of this light is compared in a spectroscope with light from a tungsten band heated to a known temperature.

BURNING CHARACTERISTICS OF COKES

It is desirable to have a method of comparing the burning characteristics of cokes in domestic furnaces which will be independent of the type of furnace, adjustment of dampers and attendance. An investigation being conducted at the Pittsburgh Experiment Station of the United States Bureau of Mines, Commerce Department, has included series of tests on several cokes in which the size of the cokes, the rate of burning, and the size of the furnace were varied. The object of these tests was to determine whether the relation between the burning characteristics and the above variables are similar for all cokes. If this were so, then the data from one test would be sufficient for predicting what would be the results under other test conditions. One of the burning characteristics of coke is the amount of slot opening required for the admission of enough secondary air to bring the flue gas to an average definite composition, assuming the setting to be made once for all for the interval between firing periods. A composite factor "k" which includes this size of slot opening has been computed for the 55 tests available. An analysis was made of the mode of dependence of "k" with the arbitrary conditions of the test, such as size of coke pieces and rate of burning. Very smooth curves were obtained showing that the amount of slot opening required increases with the rate of burning and decreases with increased size of coke pieces.

Waste Heat Boilers Conserve Oil And Make Saving

Installation at Plant of Portland Gas and Coke Company Described and Operating Results Given

By S. H. Graf,

Director of Engineering Research, Oregon State College

Will It Pay?

Any accessory to gas making which will return to the management full normal capital charges and an additional "profit" of 10 per cent on the investment is worthy of careful consideration. This article by Professor Graf appears to demonstrate such an advantage resulting from the wise engineering judgment of the executives of the Portland Gas and Coke Company. Furthermore, the article shows clearly how to go about determining the true performance efficiency and the interpretating of that efficiency in terms of dollars. The lesson contained is significant not only for oil-gas manufacturers; it is equally valuable for every other management in the industry. And, too, it affords a lesson in methods of studying equipment which will be instructive not alone for waste-heat boilers, but also for many other types of plant equipment and plant accessories.

DURING the past few years waste heat boilers have been installed in connection with many industrial operations carried on at high temperatures and discharging hot gases to the atmosphere. This has been particularly attractive where the process itself requires steam or power. Some cases of this sort which may be cited are various metallurgical melting and treating furnaces, cement kilns, glass tanks, annealing furnaces, coke ovens, gas benches, and water-gas generators. The practice of conservation is in harmony with the spirit of the times but can make little appeal to industry for its own sake. Earnings on invested capital must be produced, and in general, the installing of additional plant for the conservation of fuel or other natural resources is feasible only when the added investment can at the same time produce adequate net earnings. In 1921 investigational Portland Gas & Coke Co. to determine waste heat which might be recovered from their oil-water gas generators. The installation of the first unit was completed in the autumn of 1925 and others soon followed. It is the purpose of this article to describe this installation and trace through the preliminary tests, calculations, the building of the boilers, and finally to

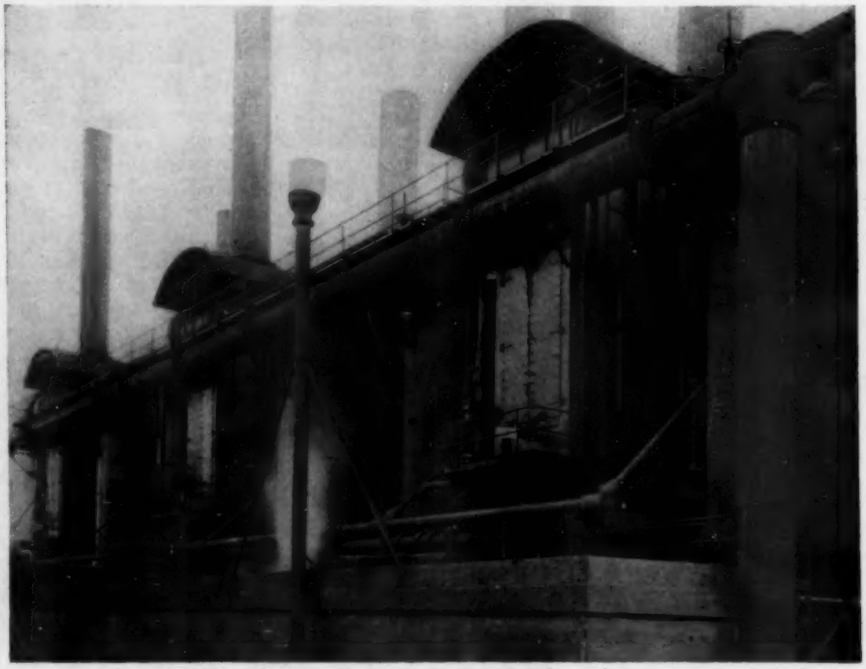


Fig. 1—Complete installation of three waste heat boilers

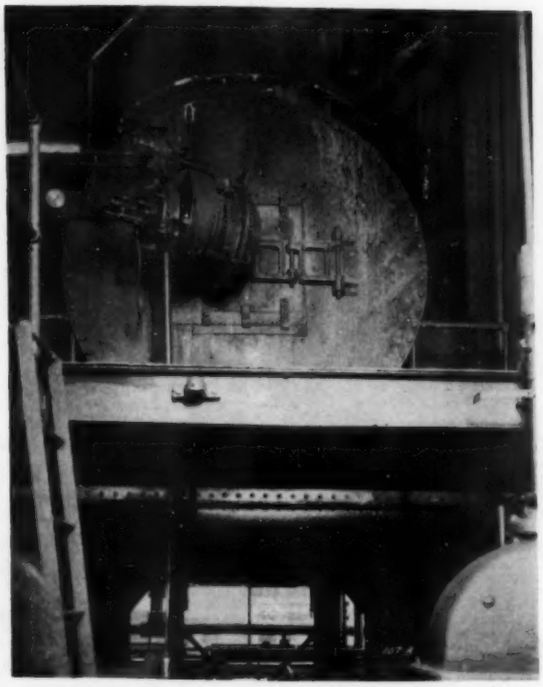


Fig. 2—Auxiliary burner for emergency use

give test data and economic results based on several years operation.

The principles involved in this study will apply in any case and should prove useful and interesting to engineers not only in gas works but in a wide variety of industrial undertakings as well.

Plant Equipment

The present generating equipment of the Portland Gas & Coke Company consists of twelve 20-foot "straight-shot" oil-gas generators, each of 2,000,000 cu. ft. rated daily capacity and one 27-foot generator of similar type of 5,000,000 cu. ft. rated daily capacity. The latter is the first of four contemplated for addition as demand requires. The 1927 sendout was about 4,360,000,000 cu. ft. and owing to the large proportion of house heating load the seasonal variation is very large, varying from about 8,000,000 cu. ft. in the summer to a winter peak of more than 27,000,000 cu. ft. The total plant steam requirement at present is about 83 lbs. per 1000 cu. ft. of gas. This includes in addition to the steam used in the process itself the steam for driving compressors for transmitting the gas from the plant to the center of distribution which is some seven miles away. Also, much steam is used in the extensive by-products business which comprises the production of carbon briquets, benzol, toluol, and tar road binders.

At present, most of the electric power for the plant is purchased, although two 500 k.w. turbo-generators are available for emergency use. Six of the 20-foot gas generators are equipped with waste heat boilers, one boiler to two generators. In addition to this, there are four 300 h.p. oil-fired water-tube boilers, one of which is usually kept hot to meet minor variations of short duration in the steam generated by the waste heat boilers. The latter operate intermittently as will be more fully explained further on. The six generators equipped with waste-heat boilers carry the base load and under light load, and even average conditions, they supply nearly all the steam required. At times when the waste-heat boilers are down for cleaning or repair, or when the generators are being rechecked, additional oil-fired powerhouse boilers can be put into use as needed.

Determining Waste Heat Available

With this comprehensive picture of the present plant and its operation in mind we shall next take up the various steps in its development. Naturally the first of these was to determine the waste heat available for recovery and the tests to arrive at this were made in March 1921 as has already been indicated.

The cycle of operation used in the oil-gas generators described is 12 minutes for heating and 24 minutes for gas making. During the heating period air at about 1 lb. pressure is blown through the generators at a rate of from 14,000 to 16,500 cu. ft. per min. The larger proportion of the necessary heat is produced by the burning of carbon deposited in and on the checkers during previous makes. If the heat from this source is not sufficient some oil may be used, the average amount being about 30 gallons. During the make periods in the 20-ft. sets oil, a 17° BC California residuum, to the amount of 350 to 450 gallons is injected into the retort space in an atomized state by the use of superheated steam. The actual time of injection is about 16 minutes, the remaining 8 minutes being used to purge the rich gas from the machine.

We are particularly interested in the heating period, other data being given simply to make clear the operation and the process. The products of combustion are much the same as from an ordinary boiler furnace

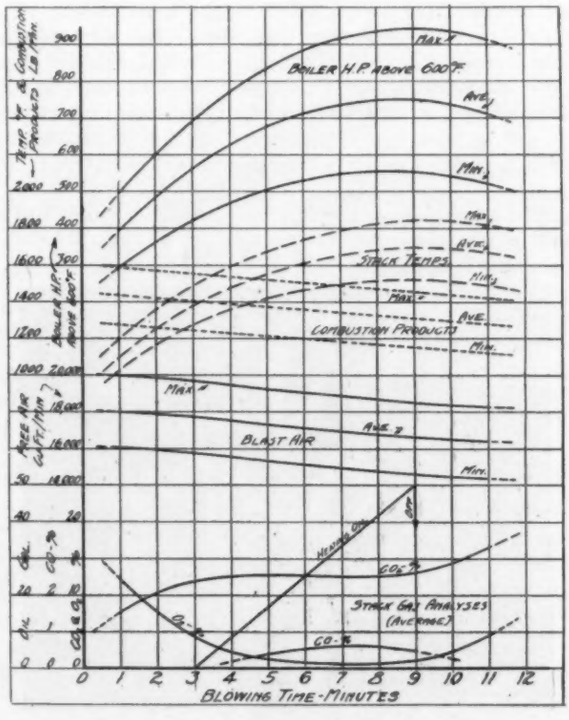


Fig. 3—Heating period data, gas generator

except that the amount of steam present is much greater, steam being used on the making sprays during the heating period to keep them from burning off. In a typical case the following analysis for combustion products was obtained:

	% by Vol.	% by Wt.	Wt. in lb./min.
N_2	82.9	76.7	1080
CO_2	13.3	19.3	272
O_2	3.5	3.7	53
CO	0.3	0.3	3
	100.0	100.0	1408

Added to the dry products listed the amount of steam was 105 lb. per min.; therefore, we have the following final proportions:

	Weight in lb min		% Specific Heat
H_2O	105	6.9	0.59
N_2	1080	71.4	0.27
CO_2	272	17.9	0.27
O_2	53	3.5	0.24
CO	3	0.3	0.27
	1513 lb.	100.0	

From this the weighted average specific heat is 0.291 applying over the temperature range of 1800° F to 500° F.

These calculations are for a case where the volume of air supplied was 18,000 cu. ft. or 1405 lb. per min. Since the nitrogen is not altered its weight is used as a basis for calculating the weights of the other gases. Temperatures of the stack gases were measured over many heating periods and it was found that the average run varied from about 1000° at the beginning to 1800° at the end. The increase in temperature is rapid at first and the maximum is reached in about 6 minutes after which the temperature remains practically constant. Some time is required for clearing the machine and it was believed that a safe interval for this purpose would be about 1 minute; hence if 1 minute is allowed at the beginning and 1 at the end, for opening of valves, clearing of machine, and finally for closing of valves, the net time available would be 10 minutes.

The boiler h.p. available is now easily calculated providing we know the temperature of the gases leaving

Fig. 4—Hot valves with vent between. Note arrangement for cooling

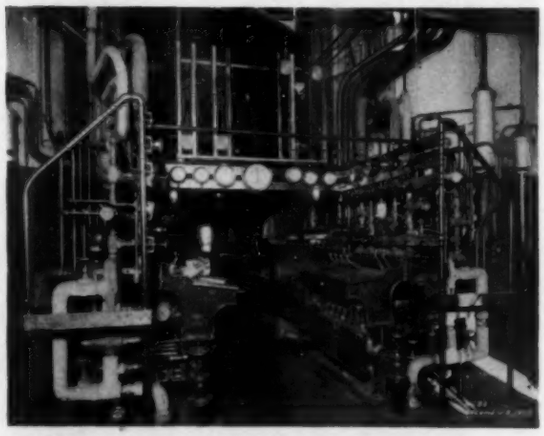


Fig. 5—Operating desks for two generators. Stack gas downcomer in background

the last pass of the waste heat boiler. The number of boiler h.p. will then be the weight of the gas available in lb. per hour times the specific heat times the drop in temperature through the waste heat boiler all divided by the number of heat units in a boiler h.p. or 33,479. These preliminary calculations indicate that there would be available above 500° F an average of about 520 boiler h.p. over the 10 minute period during which the generator would be discharging the products of combustion from heating through the waste heat boiler. Fig. 3 shows the range of these various conditions and gives a more detailed idea of how the different quantities vary. With six generators in use and three waste heat boilers and the cycle time of 36 minutes, the generators can be timed in such a way that they follow each other at intervals of 6 minutes and under these circumstances two waste heat boilers will be generating steam almost continuously giving a total of about 1000 boiler h.p.

On the basis of these preliminary calculations designs and bids were called for and the proposition of Chas. C. Moore & Company for a Babcock & Wilcox vertical-header wrought-steel cross-drum double-deck water-tube boiler with a superheater in second pass was accepted. Photographs show this boiler while under erection, the completed installation of the three boilers as they appear at the present time, and the operating desks for two generators.

Figure 4 shows one arm of the Y connection leading from the generator stack to the downcomer and gives some idea of the hydraulically operated water cooled Blaw-Knox valves. Two of these are used with a valve in the space between which is automatically opened to the atmosphere during the make period. The purpose of this is, of course, to avoid the possibility of combustible gas from the generator passing into the waste heat boiler and producing an explosive mixture which might result in a life hazard or damage to the boiler. Explosion doors are provided in the boiler setting walls. Figure 2 shows one of the auxiliary Lodi oil burners which may be used to generate steam directly from any of the waste heat boilers in case generators are down for recheckering and it is desired to use the waste heat boilers rather than the power-house boilers for steam generation.

Soot blowers are provided for cleaning and Copes

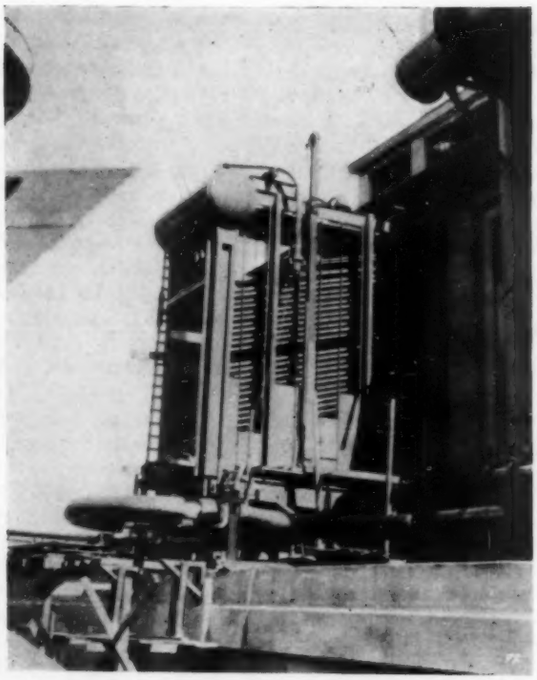


Fig. 6—Waste heat boiler under erection, showing arrangement of tubes and superheater

feed water regulators for controlling the water level; also, there is in addition to the necessary gauges a General Electric indicating, recording, and intergrating steam flow meter on each boiler. After the first unit had been in operation for several months a complete test as nearly as possible according to the A. S. M. E. boiler test code was made. The following table gives the principal items taken from the test results:

Summary of Principal Items Taken from Complete Tabulation of Test Data

No.	Items	(Averages)	Trial I	Trial II
1	Boiler heating surface	sq. ft	5587	
2	Superheater surface	sq. ft.	505	
3	Steam pressure (Drum)	lb./sq. in.	173	196
4	Steam quality (Entering super heater)	% dry	98.2	97.4
5	Steam pressure (Header)	lb./sq. in.	173	169
6	Superheat (Leaving superheater)	°F	99.7	103.0
7	Draft pressure (Bottom of downcomer)	In. water	1.50	1.94
8	Waste gas temp. (Bottom of downcomer)	°F. (t)	1799	1862
9	Flue gas temp. (Base of boiler stack)	°F. (t')	433	458
10	Sp. heat gases entering boiler	From t' to 60°F	0.285	0.284
11	Sp. heat gases leaving boiler	From t' to 60°F	0.264	0.259
12	Waste gases through boiler (Average over entire time)	lb./hr.	48,900	53,200
13	Equivalent evaporation from and at 212° F	lb./hr.	19,380	21,230
14	Boiler H. P. generated (Ave. over entire time)	B.H.P.	562	615
15	Actual rate of waste gases through boiler	lb./hr.	103,200	98,700
16	Ave. max. b.h.p. from flowmeter chart		1046	1112
17	Ave. min. b.h.p. from flowmeter chart		256	313

Heat Balance of Boiler

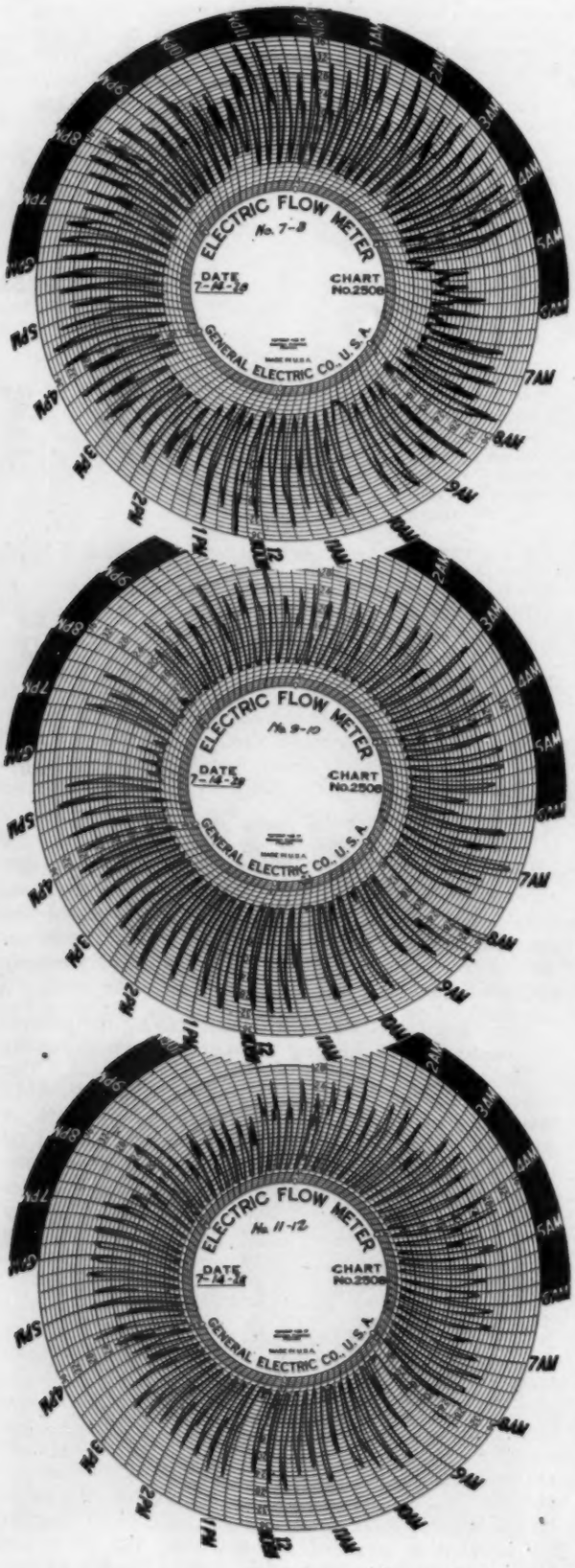
18	Heat absorbed by water and steam (% of total entering boiler) (This is the efficiency)		77.6	75.6
19	Heat loss due to moisture in blast air	%	0.2	0.2
20	Loss due to moisture from hydrogen in oil	%	0.9	0.9
21	Heat loss due to spray steam	%	2.0	2.2
22	Heat out in dry stack gases	%	16.8	16.8
23	Radiation and unaccounted for	%	2.5	4.3
			100.0	100.0

It will be seen that the steam generated or the boiler h.p. is somewhat greater than that predicted by the preliminary calculations. This is accounted for by the fact that more blast air was used at the time the tests were made than was customary in 1921. At the present time the volume of blast air averages about 15,000 cu. ft. per min. and the steam generated is very nearly that predicted.

According to tests made the heat leaving the generator stacks during heating amounts to approximately 8.5% of the total heat entering the process. The amount of steam generated during 1927 was 237,654,000 lb. which represents a heat recovery of 4.3% of the heat entering the process; thus about one-half of the stack gas loss from the entire plant is usefully recovered by the waste heat boilers on the six machines carrying the base load; so, the total thermal efficiency of the plant has been raised by about 4.2%, making it approximately 76%.

Cost Data

To generate steam by means of oil-fired boilers under conditions existing in Portland costs $0.30 per 1000 lb. of steam. At this figure the value of the steam generated by the waste heat boilers was $71,300 for 1927. The maintenance cost, including the hot valves, was $13,000 and the additional labor required which is chargeable to waste-heat boiler operation amounts to about $7,300 per year. Thus the net amount earned by the waste-heat boilers was $51,000. The cost of the installation was $223,000 including the filters for filtering the river water used in cooling the hot valves.



Figs. 7, 8, 9—Waste heat boiler steam consumption charts

If the overhead charges, depreciation, and other investment charges are taken at 12-½% the overhead expense is about $28,000, leaving a net profit of $23,000 per year or approximately 10%.

The cleaning of the boilers has not proven a difficult problem at all and aside from a few harmless puffs no explosion hazard has developed. The draft loss through the boilers is very small, never more than 2.75 inches of water; and the additional resistance for the boilers has not effected the adequacy of the blowers used for providing air blast to the sets. The amount of steam generated by the steam boilers in 1927 was slightly over 65% of the total plant requirements.

The five graphic charts reproduced herewith are records of a typical day when all three waste-heat boilers were in use. It is seen that the standby powerhouse boiler generated but little steam. Its use, at all, was occasioned by the necessity of the periodical cleaning of the sprays on the gas generators when, of course, but little steam (due to natural draft only) can be produced by the boiler in question. The chart showing the steam pressure indicates that the variation of pressure is considerable, ranging from about 150 lb. to about 195 lb. In some plants such a wide variation would probably not be permissible, but in the case described no equipment requiring very exact pressure control is being used.

When Conditions are Ideal

The ideal situation for waste heat boilers is, of course, a case of continuous operation where high-temperature gases free from soot, cinders, or mineral dust are discharged. It should be highly significant that in a case such as that described for Portland, which is beset with more than ordinary difficulties, the installation should have proven so successful.

Every specific case is an individual problem to be solved with reference to fuel costs. Generally, the temperature of the waste gases must be about 900° to pay, since naturally, the efficiency of recovery decreases with the lower temperatures. The following table illustrates this:

Temp. of Gases Entering Boiler	Temp of Gases Leaving Boiler	Assumed Loss, Percent	Radiation Efficiency Percent
2500°F	500°F	3.0	77
2000°F	500°F	4.0	71
1750°F	500°F	4.5	67
1500°F	500°F	5.0	62
1250°F	500°F	6.0	54
1000°F	500°F	7.0	43

The amount of heating surface required per boiler h.p. also will vary according to the initial temperatures of the gases entering the boiler; for example, at 2000° 8.0 sq. ft. will generate 1 boiler h.p., while at 1500° 11.1 sq. ft. will be required, and at 1000° 19.1 sq. ft. are necessary. This makes the boilers to be used in cases of low initial temperatures so costly that a point is reached at about 900°, where, as already indicated, an adequate return can not be realized unless boiler fuel is exceptionally expensive.

Boiler Selection

In the selection of the type of boiler, that is whether water-tube or fire-tube, prevailing plant conditions must be considered. With clean gas and intermittent heat

flow, fire-tube boilers may be best because of greater heat storage and a somewhat more even steam flow. There is also the matter of tightness of setting. This, in general, is easier to accomplish with fire-tube boilers. In the case of the Portland plant described, the decision in favor of water-tube boilers was made because of the greater ease of incorporating a superheater in the design, the heater being in the second of three passes. There was also the matter of dust and cinders, the trouble from which was overestimated since very little has developed. The most troublesome part of a waste-heat boiler installation is apt to be the hot-valves, if any such are required. In the installation described an original hook-up was developed for which the engineers of the company deserve much credit and which largely made possible a safe installation.

In closing, the writer wishes to express his appreciation of the courtesy of the Portland Gas & Coke Company in furnishing photographs and charts used and to Mr. E. L. Hall, General Superintendent, for permission to make public the test results and other data.

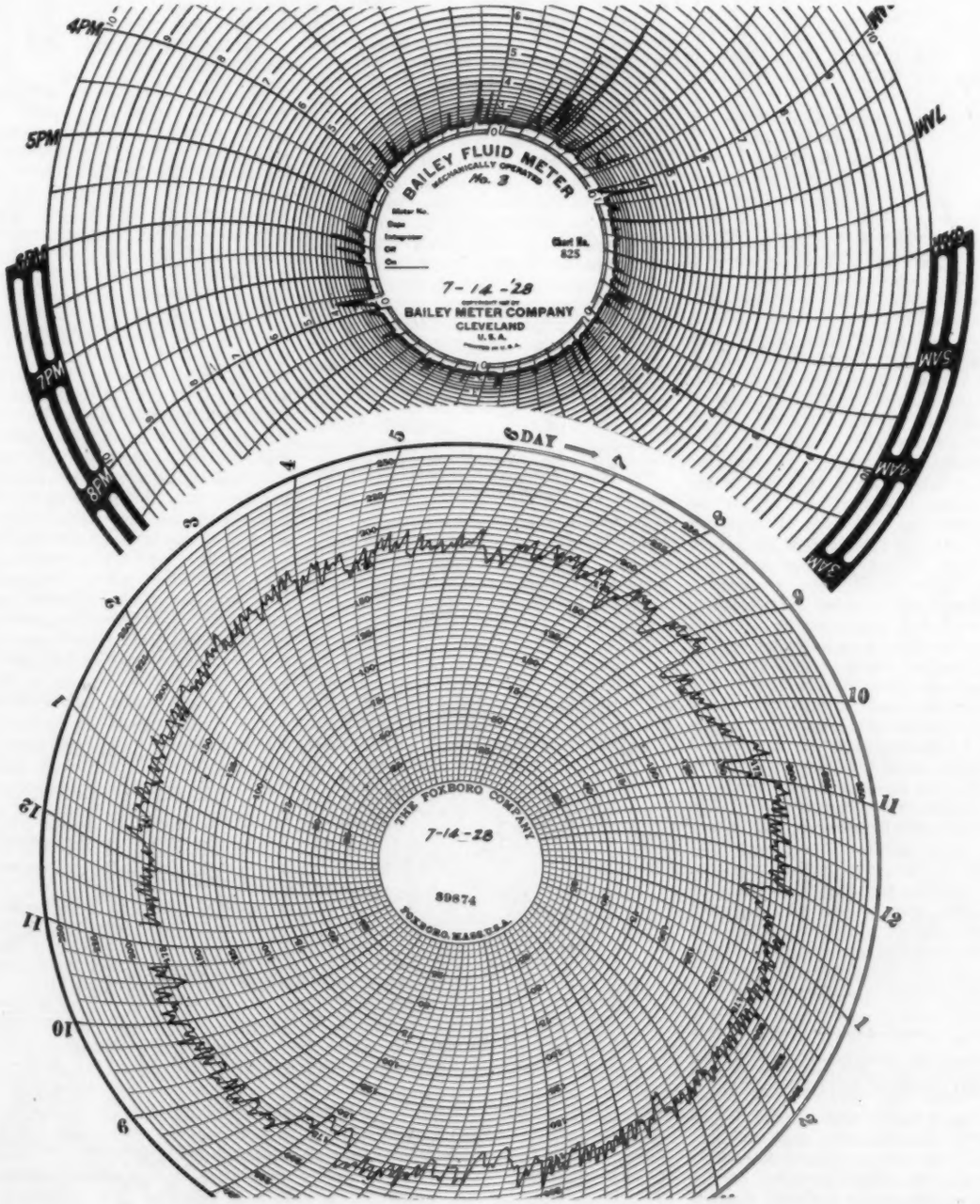


Fig. 10 (above)—Standby powerhouse boiler steam consumption chart. Fig. 11 (below)—Steam pressure chart

TECHNICAL AND GENERAL MISCELLANY

PAINTING SERVICE PIPE

A machine is used to carry out the operation which is claimed to reduce the labor cost to about one cent per length. Due to the fact that the machine applies a much heavier coating of the preservative, the cost of paint is higher than when dipping or hand painting. This thicker coating, however, lasts longer in the ground and hence it reduces the ultimate cost of the service.

The machine consists of two sets of circular brushes and a paint spray. The first set consists of three steel wire foundry brushes, while the second set is made up of four ordinary circular bristle brushes. The paint spray is a ring of pipe with holes bored on the inside, through which paint is sprayed. The whole apparatus is mounted on a steel framework with a chain and sprocket drive for the brushes, a gear pump to circulate the paint and a paint tank equipped with a gas burner underneath it to heat the paint supply. The brushes are rotated from a countershaft belted to a one horsepower motor placed below on the bed of the machine.

As the pipe is fed through the machine, it rests on rollers which take the weight off the bottom brushes, and ensure the easy passage of the pipe through the machine. As the pipe enters the machine, it first passes between the wire foundry brushes, which are revolving at about 800 R.P.M., cleaning the pipe thoroughly of all dirt, grease and rust. From these brushes the pipe passes through the spraying ring, where hot paint is sprayed on at high velocity. Surplus paint drops below into the paint supply tank from which it is circulated again to the spraying ring by the pump.

The paint supply is contained in a galvanized tank open at the top, and extending under the spraying ring. The top of this tank is covered with a removable brass screen. This prevents all dirt brushed from the pipe getting into the paint supply and clogging the small holes in the spray. Any surplus paint left on the pipe is wiped off as the pipe next passes between the stationary bristle brushes, which distribute the coating evenly over the entire surface.—*The Blue Flame.*

TESTING FOR FREE ACID IN AMMONIUM SULPHATE

While no actually new method is recommended, certain faults with old methods now in use are revealed, making the article of considerable value. Thus, a method was suggested and used depending on the liberation of free iodine from a mixture of potassium iodide and potassium iodate is found to possess all sorts of difficulties. Thus an initial difficulty is that pure neutral sulphate reacts with iodide and iodate. However, after repeated trials and experiments the following method has been evolved. Five grams of the sample are dissolved in twenty or thirty cubic centimeters of cold water, filtered and washed. The bulk of washing is made up to 100 cubic centimeters. A small amount of potassium iodide and iodate is then added to the solution, and allowed to react for fifteen minutes. The bulk of the solution is then made up to 400 cubic centimeters, a small quantity of starch solution is added, and the blue color is discharged by titration with hundredth normal sodium thiosulphate. The latter solution is standardized by running simultaneously a test containing five grams of pure neutral ammonium sulphate to which has been added approximately the same amount of acid as is to be determined in the sample.—*Chemical Trade Journal and Chemical Engineer through Gas Journal (London).*

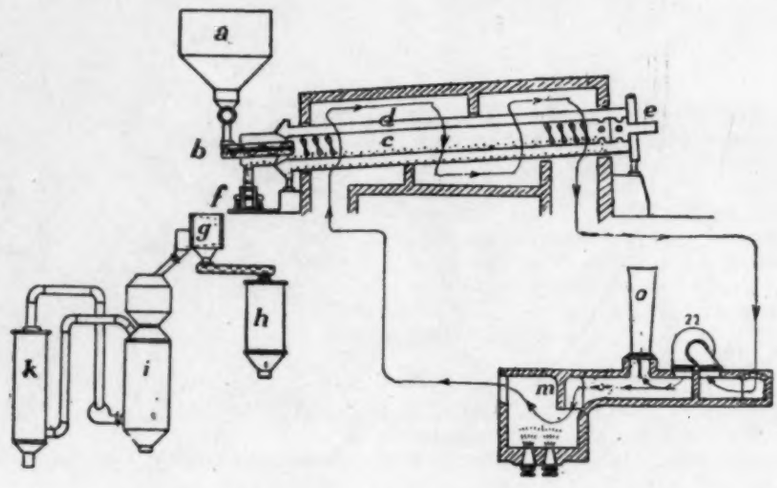
LOW TEMPERATURE CARBONIZATION

This subject is discussed in a very comprehensive fashion in a report made by the Tar, Benzol and By-Products Committee of the Association Technique (French Gas Association) which is also concerned with the debenzolation of wash oil. The various low temperature carbonization processes are analyzed, classified and the various characteristics of the products, liquid, gaseous and solid are discussed. The utilization of semi-coke is also an important part of this report. In the proper condition semi-coke can be employed in the gas works for the manufacture of water gas. Even if the semi-coke is pulverized, its gasification is possible but much more difficult and special processes must be employed.

An interesting gas generator using coke dust is the one patented by the I. G. Farbenindustrie A. G. The generator is built in the form of a very large chamber and the blow is carried out with air at 600 to 700 degrees C and at a pressure high enough to cause violent agitation of the fuel bed, which prevents localization of combustion and uniform temperature reaches 1100 to 1200 degrees C. perature rise results. Steam is injected when the temperature reaches 1100 to 1200 degrees C.

The illustration shows a Cantieny retort. This retort consists of two concentric rotatable cylinders, about 60 feet long and inclined five degrees to the horizontal. The inside cylinder, which is about five feet in diameter, is kept at a temperature of 200 to 300 degrees C, and the external cylinder, which has a diameter of nine feet, is maintained at a temperature of 600 to 700 degrees C. The coal from the hopper (a) is fed to the lower end of inside cylinder (c) by means of an endless screw (b), and is propelled up the cylinder (c) by means of a rotating helix. During this passage, it is progressively heated and arrives in a dry state at the higher end of the cylinder at a temperature of 250 degrees C. Thence the coal drips into the outside cylinder (d) and meets a temperature of 600 degrees C. There it is carried down by gravity in the smooth annular space between the two cylinders and at the end of the return travel it has been carbonized to semi-coke. The cycle is completed within two and one-half hours. The semi-coke is raised into the discharging chamber by radical fins, the actual discharge taking place on the same side of the apparatus as the charging. The gas offtake (e) is at the upper end of the machine.

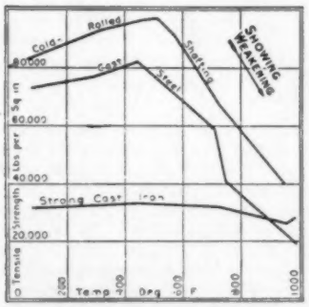
Other parts of the apparatus are the dust trap at (f), the coke screen (g)



cooler for small coke (h) and one for large coke (i). The coke cooling system is shown at (k), the combustion chamber at (m), the fan at (n) and the stack at (o).—*Gas Journal, Aug. 22, 1928, pages 412-3.*

STEEL FOR HOT STEAM

The strength of the metals used in apparatus that is subjected to high temperatures is becoming of increasingly great importance due to the use of both high temperatures and pressures in process works. The curves, shown in the accompanying illustration, are for iron and steel and indicate how the tensile strength drops off dangerously towards 1000 degrees F. However, recent developments in the manufacture of electric steels have produced a cast steel as strong at 1200 degrees F as ordinary steel at 900 degrees F. For cast iron the behavior probably depends upon the amount of silicon in the composition. Silicon has a tendency to combine itself with the iron, driving out the carbon and leaving the structure weak at high temperatures. The better grade of cast iron can be used for highly superheated steam without any bad effect.—*The Power Specialist, Sept. 1928, page 9.*



How high temperature reduces the strength of superheated tubes.

INFLUENCE OF PREHEATING ON THE THEORETICAL COMBUSTION TEMPERATURE OF GASEOUS FUELS

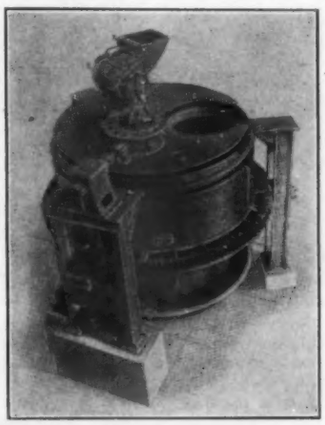
The influence of preheating on the theoretical combustion temperature is investigated in greater detail with respect to the carbon monoxide and hydrogen in the gas. The effect of the temperature in causing the decomposition of water and carbon dioxide is also considered. The carbon monoxide flame appears to be hotter than the hydrogen flame but actually this is just the reverse.

The degree of dissociation of carbon dioxide and water increases with the temperature, but this increase does not take place in a straight line relation but somewhat slower, then becoming greater. Preliminary heating of the gas results in an increase in the combustion temperature. If no thermal decomposition of the combustion products takes place, then the combustion temperature must increase in a straight line relation with the sensible heat. If the gas and the combustion air are preheated to greater degree, then the combustion temperatures deviate from a straight line rise as the degree of dissociation increases. Later they again approach the straight line relation, as the decomposition tends slowly to attain the hundred percent maximum value. Then the combustion temperature increases only in such degree as it is preheated, but then it increases again in a straight line relation.

The net conclusions that were drawn from this investigation are first, that the hydrogen flame is rightly considered as the hotter flame, that is, hotter than the carbon monoxide flame. Within certain limits, however, the carbon monoxide flame will give higher combustion temperatures. These limits become more extensive as the excess of air in the gas mixture increases and this limit lies at low preheating temperatures. While hydrogen will always give the higher flame temperature when theoretical quantities of air are mixed with the gas, when the excess of air is about twenty percent a change in the flame temperature conditions is already noticeable, and this change is most emphasized when the excess of air is forty percent.—*Dr. Fritz Schuster, Contribution from the chemical and thermal division of the Berlin City Gas Works. Das Gas und Wasserfach, 1928, pages 759 to 761.*

FULL MECHANICAL PRODUCER

The new producer is characterized by possessing full mechanical operation from the feeding of coal to removal of ashes.



The mechanical coal feeder, without metal to metal contact between stationary housing and multiple pocket drum, greatly reduces wear, and gas leakage between the stationary and moving member is prevented by means of a water seal.

The fuel bed is positively agitated by means of a single, straight poker bar, which can be easily and quickly replaced. The revolving ash pan, supported by three accessible conical rollers, rotating at the same speed as the producer shell prevents grinding of ashes and subsequent increased resistance to the passage of the blast. An adjustable ash plow permits continuous plowing of ashes, regardless of the amount of coal gasified.

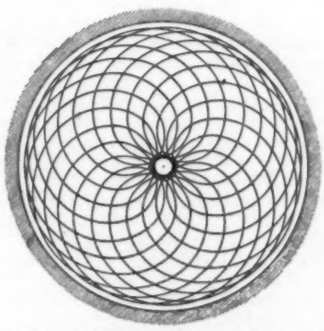


Fig. 2 Diagram showing agitation of the fuel bed during six revolutions.

The ashes are further agitated and removed from the center of the producer towards the outside of the ash pan by means of a stationary agitating blade and thence discharged by the mechanical ash device. The gas producer is of self-supporting construction permitting installation independent of the producer building.—*Fuels and Furnaces, Sept. 1928, 1251-2.*

PROGRESS IN BURNING COAL

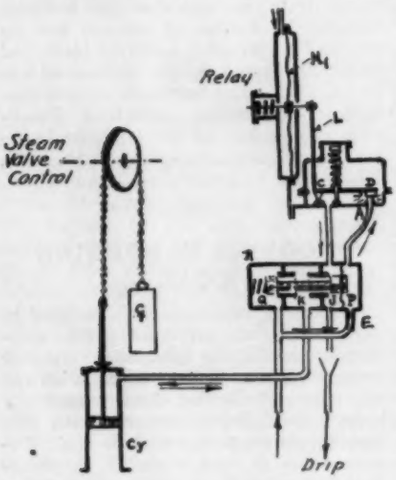
Progress in burning coal is assigned to increase furnace size and better combustion conditions, increased furnace temperatures, a better appreciation of the effect of radiant heat transfer, a better appreciation of equipment and furnace requirements for various coals, improvements in stoker design, improvement in powered coal systems and better instruments and improved furnace control. The latest improvements are discussed under these various headings.

A number of interesting prognostications regarding future trends completes the article. Amongst these may be mentioned that furnace sizes for stokers and for powdered coal will not be decreased but may even be increased, that new furnaces will aim to secure the highest furnace temperature possible to assure rapid and efficient transfer of heat, that water-cooled walls will be used to an increasing extent, that improvements in stokers may be expected through better distribution of air below and above the fire, and automatic control. Amongst others are that more extensive use will be made of control instruments, that improved drying and pulverizing methods, mixing burners to secure the best degree of turbulence in a water-cooled furnace and more intense heat evolution per cubic foot

of furnace volume, will probably be features, that better utilization of radiant heat will be secured by modification in design.—*A. G. Christie, Engineers and Engineering, 1928, pages 99 to 107.*

TAR EXTRACTOR REGULATOR

The illustration shows the manner of operation of a unique tar extractor regulator. In normal operation, the pressure of the gas on the first membrane M^1 is counterbalanced by the action of the regulating springs r. The lever L moves about the point C which is immovable. The water coming from the filter under pressure passes through the contraction portion of the pipe E and enters the chamber P which is closed by a second membrane M^2 and flows through the connection A under the plate D. Then it returns into the chamber J (equilibrium of pressure being thus maintained on both sides of the membrane M^2) and flows out through the drip. The cylinder Cy is connected with the chamber K which acts as a distributor. This chamber is actually closed. The water which is imprisoned in this manner effects equilibrium or counterpoise, maintaining the inlet steam valve to the machine motionless.



When the exhaust or suction effect is too strong, then the regulator will act in the following manner. The vacuum in the pipe in contact with the left face of the membrane M^1 increases. This membrane is displaced in quite a sensitive manner which is due to the great diameter of the membrane, amplifying the small depressions. The lever L is actuated, which rotates about C towards the left, raising the plate D above the fitting A. The increase in the flow in A beyond the contraction E causes a drop in pressure within the distributing chamber D. The membrane M^2 is then pushed to the right, which establishes a communication between the chambers K and J. The chamber K in communication with the auxiliary engine or motor is evacuated through the intermediary action of the chamber J. Under the action of the counter-weight, the piston of the auxiliary engine is raised, driving out water through K and J and the steam inlet valve is closed until a point of equilibrium is again established.

When the exhaust or suction effect is too weak, then the regulator acts in the following manner. The reverse of the afore described action takes place. The lever L is moved to the right about C, whereupon the rate of flow of water through A is decreased, which results in an increase of pressure in P, movement of the membrane M^2 and of the distributor to the left. Communication is thus established between the chambers Q and K, water under pressure enters the cylinder of the auxiliary engine, the piston of which is lowered, and then the steam inlet valve is opened until the speed of the extractor increases, the pressure has become normal and the membranes return to their position of equilibrium.— *Le Gaz et l'Electricite, year 1928, pages 266-8.*

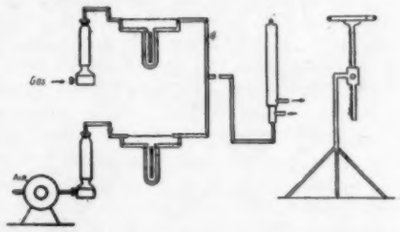
INFLUENCE OF TEMPERATURE ON THE FLAME VELOCITY OF GASES

This is the title of a very important article which appeared recently in Das Gas und Wasserfach, July 14, 21, and 28, 1928. It reported an investigation carried out by Karl Bunte and A. Steding at the Karlsruhe Gas Institute of the German Gas Association. The investigation was for the purpose of determining the effect upon the flame velocity of various gases of burning them with divided flame. For this purpose the inner flame was produced in a highly heated space, and the effect of the secondary combustion was thus eliminated, since the water gas which is formed at the inner cone merely surrounds it without itself burning.

The Ubbelhode and de Castro dynamic method was used for the determination of the flame velocity. The arrangement of the parts of this apparatus is indicated in the accompanying figure. Gas was supplied either from steel flasks or from a holder, and fresh air was drawn and supplied as required by a compressor. Gas and air were dried separately, and the supply of each regulated by means of two Kapo meters. Gas and air streams were then joined, and passed through three or four meters length of glass tubing, with several changes of direction, to ensure thorough mixing. The mixture then entered a burner tube 50 centimeters long—this great length being considered necessary to ensure an even rate of flow over the whole section. The top edge of the burner tube was inclined at an angle of 45 degrees, and the tube was enclosed, almost to the top, in a cooling jacket, in order to avoid, as far as possible, any uncontrolled preheating of the gas mixture.

A large number of tests were carried out on various gases, such as hydrogen, carbon monoxide, methane as well as water gas, producer gas, high grade coal gas and Karlsruhe city gas. The results obtained are summarized below.

The tests showed that the temperature of the zone in which primary combustion takes place affects the velocity, and consequently the flame structure, in the case of hydrogen only. With no other plain gas was any effect traceable to the surrounding temperature. In the case of gas mixtures, the flame velocity is increased only when hydrogen is an important constituent of the mixture. Even then the increase is not in proportion to the quantity of hydrogen. It was quite marked, for instance, in water gas containing some fifty percent of hydrogen, but in the case of a coal gas rich in hydrocarbons, which likewise contains 36 to 40 per cent of hydrogen, an increase in flame velocity was only slightly noticeable or entirely absent.



The raising of the flame velocity by preheating the gas-air mixture is doubtless due to the fact that the spreading of the combustion is dependent upon the heat consumption required to raise the mixture to ignition temperature. The fact that the temperature of the surrounding zone had no influence on the flame velocity of carbon monoxide and methane shows that with these gases, there was no effective rise in the temperature of the gas-air mixture as it approached the inner cone. At the same time, no effect was observed of the reduced loss of heat, which there must be with the higher surrounding temperature, and which might be expected to give rise to an increase in the combustion temperature in the region of the cone in the direction of the theoretical combustion temperature.

The different behavior of hydrogen is probably explained by its possessing some of the characteristics of metals, including a much higher heat conductivity than other gases. This is at least ten times as great as the average of other gases. That the increase in its flame velocity is reproduced in part only when in mixture with other gases can no doubt be partly explained by the stochiometrical proportions of the air requirement.

EFFECT OF THE PREVIOUS USE OF GAS FOR THE REMOVAL OF NAPHTHALENE FROM COAL GAS ON THE GAS-MAKING VALUE OF THE OIL

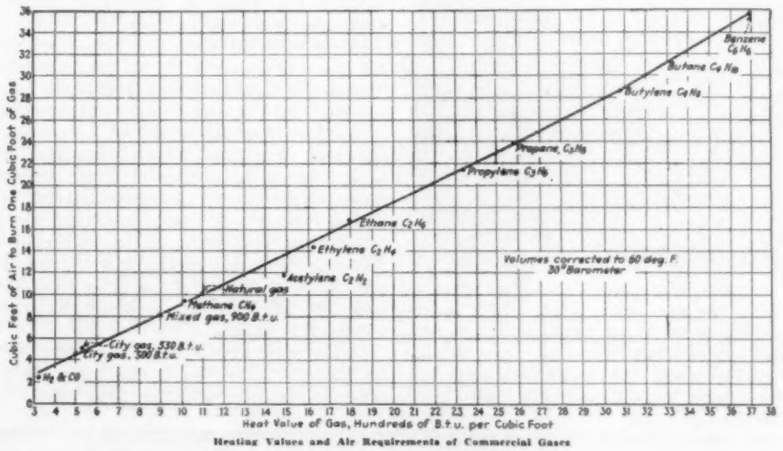
When coal gas is treated in a rotary washer with gas oil for the purpose of removing the naphthalene contained in its, the spent oil is usually consumed on the carburetted water gas plant. The properties of the oil are affected both by the naphthalene which it dissolves and by lower boiling hydrocarbons. Using 15.3 gallons of oil per million cubic feet of gas, the specific gravity was changed from 0.8709 to 0.8804, the flash point was lowered from 76 degrees C to atmospheric temperature, and ten percent of the oil was distilled at a temperature of 150 degrees C in comparison with 221 degrees C for the original sample. Gas making experiments were carried out at

different temperatures in a modified form of Ross and Leather apparatus; a tactor expressing the value of the oil was obtained by multiplying the volume of gas per cubic centimeter of oil by its content of hydrocarbons, and it was evident that the value of the oil was lowered by use in the washer.

Further tests were carried out in the plant. In one case a new oil was used and in the other case a mixture of four parts of new oil with one part of spent oil. By assuming a constant calorific value for blue gas and a constant ratio of oil gas to water gas, the yield of therms per gallon of oil was found to be 1.0787 and 1.0218 respectively. Interpretation of these figures shows that the therm yield per gallon of spent oil is 0.7942.—*H. H. Thomas, Gas Journal, 1928, volume 182, pages 538 to 540.*

HEATING VALUES AND AIR REQUIREMENTS OF COMMERCIAL GASES

The curve which accompanies this abstract is of considerable utility to the man who is dealing with thermal problems. It shows the cubic feet of air required to burn one cubic foot of gas of various thermal values per cubic foot. The volumes that are read off the chart are corrected to 60 degrees F and 30 inches of water. While the figures obtained are approximately only, nevertheless they are of real value and facilitate thermal calculations.—*Chemical and Metallurgical Engineering, volume 35, number 8, page 496.*



Heating Values and Air Requirements of Commercial Gases

INDUSTRIAL HEATING BY SOLID, LIQUID AND GASEOUS FUELS

To obtain entire protection against scaling in the heat treating of metals, an atmosphere of combustible gas must be maintained. The ease with which this is done in case gas is used as the fuel forms one of the important advantages of gas as an industrial fuel. The following tabulations give interesting figures on consumption of gas in both the ordinary type of furnace and also in the furnace provided with recuperators or regenerators. These figures are representative of standard practice with due consideration of variations due to local conditions, such as character of the charge, rate of heating and temperature.

Heat Required in Therms in City Gas Per Ton For Typical Industrial Heating Operations.

Operation	Ordinary furnace	Recuperative or regenerative furnace
Hardening	20 to 35	15 to 20
Tempering	20 to 25	10 to 15
Annealing	20 to 35	15 to 20
Normalizing	20 to 25	12 to 17
Rivet heating	55	
Billet heating, 950 degrees C	30 to 35	15 to 20
Billet heating, 1250 degrees C	35 to 40	20 to 25
Forging	34 to 75	20 to 30
Plate heating	30 to 40	20 to 25

OPERATION OF A WATERLESS GAS HOLDER IN FRANCE

Figure 1 shows the special design of the seal for the disc. The seal is seen at A and is filled with tar to a sufficient depth to prevent the gas escaping between the disc and the walls. The tar runs down the walls and is collected in a channel B, whence it passes by way of the syphons T into sumps C. Thence the tar is raised to the seal by electric pumps which are automatically put in and out of action. A float causes completion of the electric circuit when the tar reaches the maximum permissible height H_1 in the sump, and breaking the circuit when the level falls to the minimum H_2.

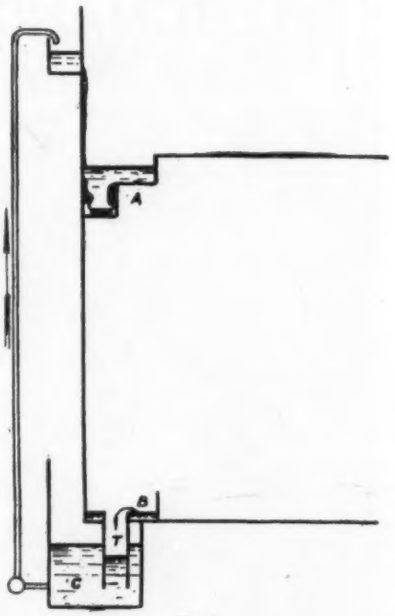


Fig. 1.

Water carried by the gas will float on the tar and will eventually find its way through the syphons to the sumps. Taps are provided on the latter so that the water runs off. A special arrangement is provided for automatically draining away the water. The simple modification is shown in Figure 2. It consists simply in the addition of a syphon S of which the inner end is fixed at such a level that the tar and water naturally separating out in the chamber T, water only will be syphoned out by S while tar only will pass through T into the sump.

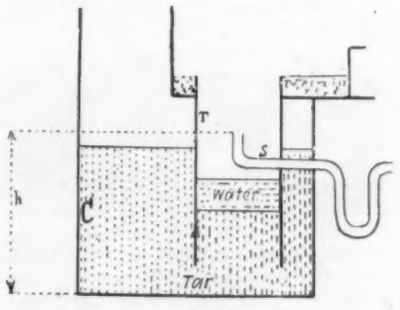
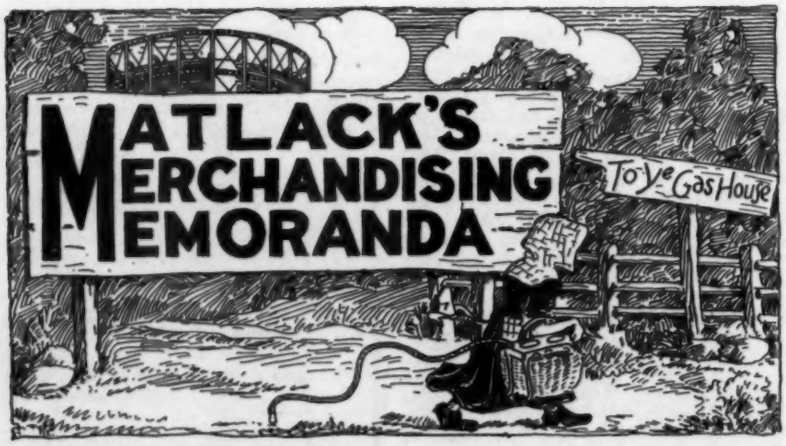


Fig. 2.

The variation in the viscosity of the tar is an important matter, but a record kept of the viscosity over a period of nine months showed that the viscosity of the tar did not increase.—*M. A. Bazille, Paper read before the French Annual Gas Congress 1928, Gas Journal of London, pages 263 to 265, August 1, 1928.*



"MARKED DOWN" SALES

Right now the gas man who knows his merchandise is marking it down and and assembling it for the big January Clearance or Inventory Sale. Some of the men we know make this the one big "hip-hurrah" sale of the year and go to especial pains to give it the appearance of a sale using red or other colored price tags, special show and store cards, and store banners, to say nothing of truck banners and bold black heads on newspaper ads.

"This is the one sale of the year that we let down the bars for," said one commercial manager. "We want to rid our stock of every item that can in any way be termed a slow mover and we cut the price to the bare bone; we use sizable newspaper space and we tell folks frankly that our reason for this special sale to clear out our warehouse and store room to make room for incoming merchandise. We have done this now for about four years and it pays so well that we have made it an annual event. And you may be sure it does not effect our announcements of new and improved models which we make in February. Folks hereabouts have come to look upon us as real merchants."

HERE'S HOW

Gas men who are in earnest about their desire to build up the merchandise and gas sales per domestic meter will do well to look to small appliances. Gas percolators, dutch ovens, toasters, waffle irons and corn poppers in season, cookie pans, double boilers, cake and pie plates, griddles and any number of other things are appliances that home managers will purchase and use if the Home Service department will bring them to their attention. Waterless cooking has taken certain sections of the country by storm. Why not look about for a few appliances that may be used for that kind of cooking and offer them for sale in connection with gas ranges? Keep the home manager supplied with new, tasteful, tested recipes and kindred appliances to cook them in and your sales of both gas and appliances will show a nice increase.

Change is what folks want—why not supply it, and keep up your curves. A wee bit of study and a few visits to the household departments of the large department stores will keep you up-to-date on what the new trends in home management are.

RADIO COOKING LESSONS

Recipes via radio do a great deal to boost the per meter load. This is especially true if the broadcasting is carried on during the Fall and Winter months, when the home manager has more time indoors and when the question of "what will I have for dinner or my bridge luncheon" is an almost daily one.

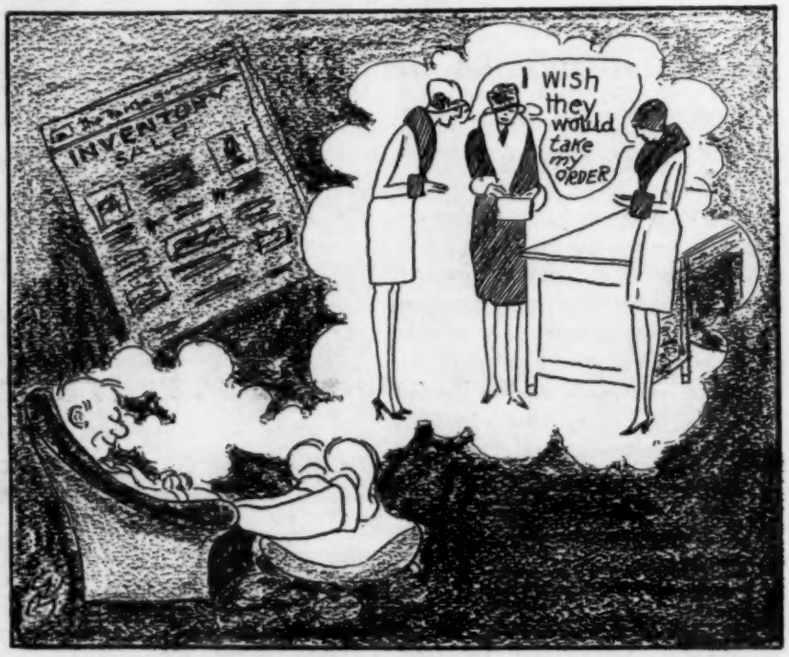
A number of gas companies and manufacturers are now on the air helping the gas man to build up his per meter sales. The latest announcement of a cooking school on the air comes from Roper of Rockford.

This company has planned a series of ninety cooking lessons which are to be broadcast over a number of the larger stations throughout the country. Dealer advertisements have been planned to tie into the National program and dealers are also furnished poster stamps for use in playing up the feature.

GO STRAIGHT TO HEADQUARTERS

"You can count me out," said an old timer the other day after he had experimented with the back door approach to the home manager. "I've been at this business a long time and I thought that possibly if I'd try a new approach I might build up my sales and save a lot of time. You see I had a hunch that women might be getting tired of coming to the front door to listen to sales talks and maybe I could get my story over more often if I went to the back door. But a week's trial at that has convinced me that the front door approach is the one for the man representing the gas company to make."

"This man found that too frequently he was turned down by someone other than the purchasing agent when he went



Here's the gas man in reverie. The old boy has just finished planning his "Big January Clearance Sale" and has fallen asleep, to dream of the rush on opening day—when home managers with money in their purses invade his store.

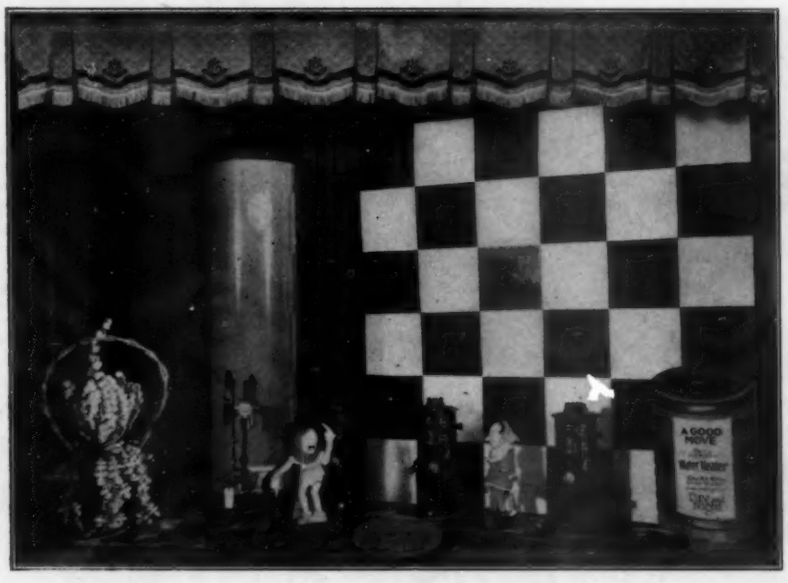
to the back door, while on the other hand the woman of the house usually answered a ring at the front door. We are inclined to believe that the gas appliance salesman should go to the customer via the

shortest route, the front dooor, for he has a message for the home manager that is interesting and profitable and for the other reason that he is the representative of the city's outstanding organization.

ARTISTIC ECONOMY

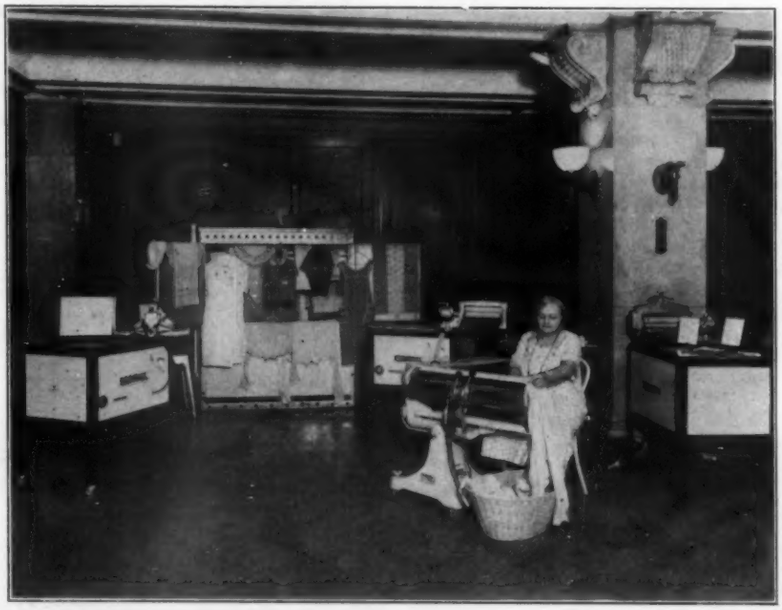
Gas men over the country say that they cannot go in for elaborate windows and notwithstanding that in many, many instances they can find artists to paint scenic or figure backgrounds, most generally they cannot afford to pay the artist what he asks for the painting. For that reason we are submitting a window that we feel most any company can afford to produce.

This window attracted a great deal of attention and was the direct means of selling considerable merchandise. The checker board and the checker stack display card are cut out of composition board, the drape on the floor is a piece of velour (may be anything you happen to have), the flowers may be had at ten cents per at the dime store, and the figures are likewise cut from composition board. The whole thing cost much too little to talk about and surely there is someone in your organization that can use a paint brush and a saw.



THEY SHOW 'EM IN MISSOURI

The way to sell laundry equipment is to demonstrate it in actual use. There can be no question about that. The place to demonstrate this equipment is right up front in the store, where every one entering may have an opportunity to view it. The accompanying illustration shows how the Laclede Gas Light Company St. Louis does it. Here you see the full line handled by that company in actual use and we understand that they are selling a lot of laundry equipment these days.



What's become of the bird that use to approach us with the exclusive franchise to sell this or that? That old boy would blow in and hammer your desk and tell you that if you did not give unto his contract your signature and a car-load order he would walk right out and turn that most valuable of things, his franchise, over to the furniture man,—who was just rar'in' to go with it and you would have to sit by and see all that good business pass your door.

It has been so long since we have met this bird that we had almost forgotten that he existed; we reckon he may be somewhere in that crowd that besiege the average gas man with real helps, merchandise and new numbers, but we doubt it. Change in business is so rapid these days that we are forced to think the old boy has just checked out.

TRY THIS

In staging a sale of gas waffle irons one of the southwestern gas companies is presenting each purchaser with a package of flour and several tested waffle recipes. In order to put the sale over in a big way the cooperation of a number of local grocers was obtained. These stores exhibit the waffle iron along with the flour and the gas company furnishes them with recipes to hand out to their

customers.

It seems to this writer that a plan along this line might be worked out to aid in the sale of a number of appliances. Bakers might be induced to cooperate in the sale of gas toasters, and a plan might be worked out whereby the toasters could be sold at a special price by the bakers.

AN ADVERTISING TIP

A great many gas men are confronted with the problem of furnishing certain lists of newspapers with copy. These papers range from the special edition to the weekly and semi-weekly, and all have a coverage that duplicates the local daily. The problem is most usually solved by "just passing out an add" when the solicitor calls, "just any ad" to fill up space and give the company representation.

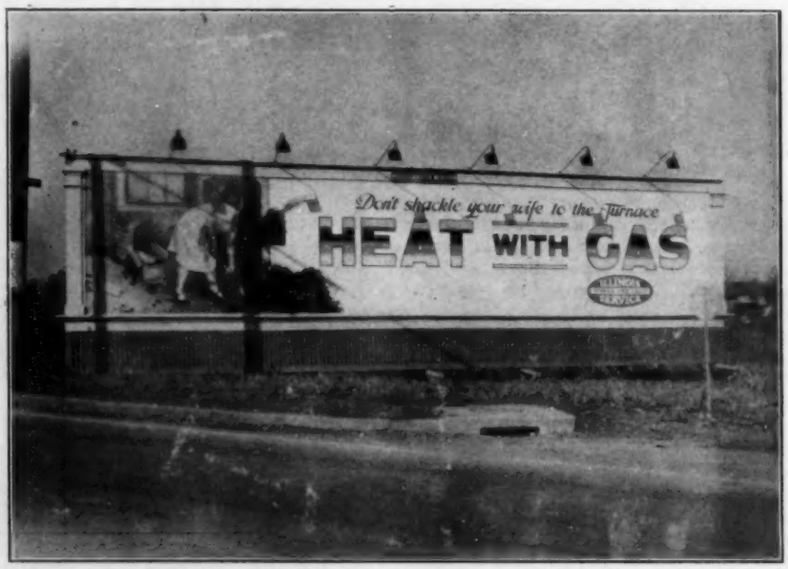
The Illinois Power and Light Corporation is one of the organizations that have not done this. This company feels that each and every advertisement that it runs should have a sales message of some sort and with this idea in mind, they have produced a series of small advertisements and had mats made. And now, instead of just running an ad, they furnish the newspapers with seasonal advertisements that tie into the advertising done in daily newspapers, on bulletin boards and by direct mail.

A check up indicates that more advertising may be done on this basis at the same cost than was done when the various publications, other than the daily newspapers, were "just given an ad." Moreover, the results are very much more satisfactory to all concerned. The reproduction on this page. furnishes an idea of the type of ads used to exploit house heating. These ads were run early this fall before the general newspaper copy was released.

fuel
for the balance of your life---and never lift a shovel---use GAS---
The Care free fuel to heat your home.
Illinois Power and Light Corporation
For a cleaner, healthier city, as well as a greater city, we offer GAS
The Care free fuel for home heating
Illinois Power and Light Corporation
relax
next Winter---let us assume the responsibility of heating your home with GAS---
The Care free fuel
Illinois Power and Light Corporation
like fluctuations in fuel prices, do not worry the user of The Care free fuel
GAS, for home heating
Illinois Power and Light Corporation
you are assured of uniform, continuous heating service when you use GAS---
The Care free fuel
Illinois Power and Light Corporation
let us assume the worries of heating your home next Winter with GAS---
The Care free fuel
Illinois Power and Light Corporation

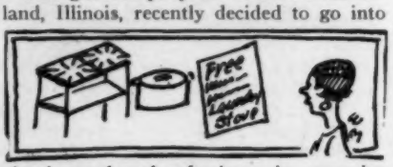
DAY AND NIGHT BULLETIN

Below we are producing another of the Illinois Power and Light Corporation's day and night bulletins. These bulletins are painted by a local artist, from designs worked out by the company's advertising department, and have attracted considerable attention through out southern Illinois.



IT WORKED

The gas company at Moline-Rock Island, Illinois, recently decided to go into



the home laundry business in campaign fashion and through the use of a bill sticker and an insert sold over three hundred two-burner laundry stoves in thirty days' time. Briefly the plan was to sell the stove delivered and connected and to give the purchaser a galvanized boiler for use on the stove as a premium, and—it worked.

THE BIG PUSH

Copping sales by employee cooperation is a mighty fine way to build boosters among your own employees. Here is the way it is done.

Groups of employees are assigned quotas of various appliances over a given period, a Captain is appointed and prizes are posted. Then everybody gets into the selling end of the business for thirty days. As a usual thing the first sales are made to employees by employees;—thereby gas company employees begin to take their own medicine. They like it and the first thing you know they sell their friends and finally they sell all comers.

EXPOSE THE CULINARY SECRETS

When you mail out a merchandise statement or a gas bill, enclose a piece of direct mail advertising of some sort. Recipes make good inserts and home managers by the thousands are ever eager to have new tested recipes.

Send them recipes that your home economics expert has tested and do not be afraid to give that department credit for them;—say, "this recipe has been tested by our home economics department."

Home managers like to try new and tested recipes and in the movement on to get folks to do more home cooking and less eating out of the can nothing is quite so effective and inexpensive as the tested recipe sent to the woman in the home at frequent intervals.

THE CHRISTMAS SEASON brings with it kindly thoughts of our many good friends throughout the gas industry. To them and to all gasmen everywhere, we extend our heartiest greetings for

A Very Merry Ghristmas

STACEY BROTHERS GAS CONSTRUCTION CO.

CINCINNATI, OHIO

NEW YORK — BOSTON

GAS PLANT ENGINEERS

BUILDERS OF SAFE - ECONOMICAL - PERMANENT

GAS HOLDERS

The Stacey Brothers are the Pioneer Gas Holder Builders of America

FAST and SURE

Real and rapid progress is made in laying pipe when every length of pipe is uniformly round and straight.

That is the history of laying Smithsteel pipe. Alignment, stabbing, and laying are fast and sure.

SMITH*WELDED*

GAS LINE PIPE

A. O. SMITH CORPORATION, ***General Offices: Milwaukee, Wis.***

OIL AND GAS FIELD PRODUCTS DIVISION

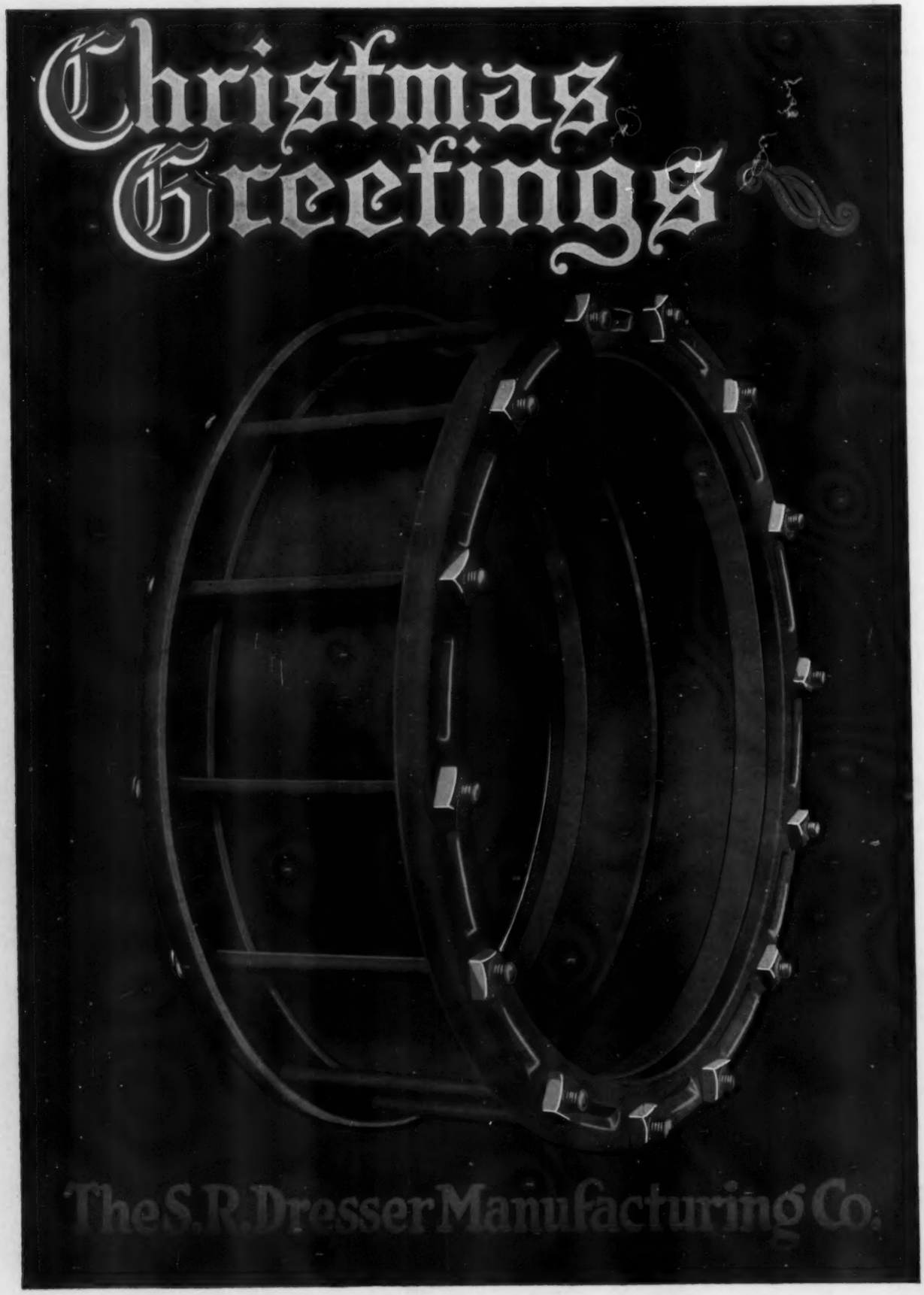
District Offices at New York City, Pittsburgh, Tulsa, Houston, Los Angeles

To the Members of the
GAS INDUSTRY
Everywhere
We wish you a Heartfelt

Merry Christmas!

and a
Happy Prosperous New Year

SAFETY GAS MAIN STOPPER CO.
Patrick Goodman, Owner
523 ATLANTIC AVE. — BROOKLYN, N. Y.


Chrisfmas
Greefings
The S. R. Dresser Manufacturing Co.

Maximum Selling Qualities in Gas Range Displays

By Willis Parker

SEVERAL factors must be considered to succesfully bring out the qualities of gas ranges in window displays, according to C. F. Warmoll, display manager of the Public Service Company, Denver, Colo. Here is a firm that gives as much attention to the details of good window displays as does a department store, a jeweler or any dealer in costly mechandise. In fact the same care is given to the arrangements and "stage settings" for a display of ranges as is given by a jeweler to his displays of gold watches and diamond rings.

The character of the merchandise must first be considered, according to Mr. Warmoll. What is a gas range? Primarily it is a kitchen utensil designed to provide convenience in cookery. In its own way it contains beauty. Kitchen furnishings are not, however, so beautiful that the owner would even consider placing them in the living room or den along with Oriental rugs and floor lamps and expensive pieces of art. In fact a gas range contains in itself nothing equal to a beautiful bedroom suite or parlor set to attract the attention of the window shoppers. The mere placement of the range in the window cannot be expected to bring results in the form of sales. There must be something more.

Hence the background, the foreground, the lighting arrangements—they all must be given first consideration in a gas range display. Therefore the display manager should plan a background or other decorative effects that will grasp the attention of the window shoppers. While examining the background, either casually or purposely, they will notice the range, which because of its environment, begets more attention and makes a better impression upon the minds of the visitors than it would get under ordinary circumstances and under ordinary decorative effects.

Accompanying are two photographs of windows put in by the Public Service company. Observing the arrangements as depicted by the pictures and the explanation of the decorative effects brings out the ideas Mr. Warmoll has in mind. We will consider first the Christmas window.

A case wherein a fantastic background caught the attention of window shoppers and almost forced them to notice the range.

In this case the background was constructed of black oil-cloth which contained exceptional reflective properties and was in extreme contrast with the gas range in which white predominated. The shimmering blackness of the background would in itself attract attention of window shoppers. But the attention attracting properties of the cloth were accentuated by throwing various colored lights upon it. Red, blue, green, amber and white lights were used, with startling and somewhat awe-inspiring results.

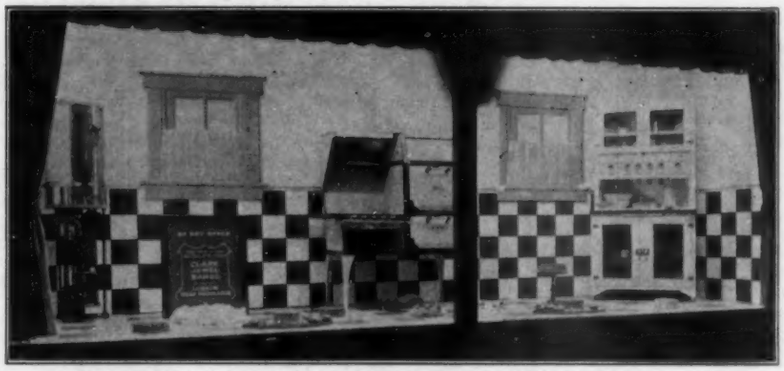
It will be noticed that the range did not occupy the center of the stage,—it was set to one side. On the opposite side of the window was a fantastic Christmas tree constructed of silvery material which also served to reflect in a scintillating manner the color from the lighting system. The actual center of the stage was occupied by a framed show card suggesting that Mother be given a gas range for Christmas. The make of the range and the fact that it was equipped with an oven heat regulator and the thought—"365 days of happiness for Her each Year"—was all of the information the card contained. A holly wreath and a red ribbon served to "tie-up" the range in a package for Santa Claus convenience.

The floor was covered with shiny black oil cloth which also emphasized the whiteness of the range and the silvery Christmas tree. A strip of white satin cloth formed a base for the tree and it led from the tree to the window at an angle.

A white artificial flower was laid carelessly on the floor in front of the show card.

Consider the angle of vision. Notice how easy it was for the eye to be led to the range. It is natural for us to begin at the left of a scene and follow backward and to the right. The range was at the window shopper's right. Taking the window as a whole, his eye fell upon the display at the extreme left, followed the strip of white satin cloth to the silvery tree, thence to the shimmery background, thence to the stove. Pulling away from the stove, the eye fell upon the show card and its printed message.

A spot light, burning a clear light, was thrown upon the range to make it stand out in increased prominence from the decorative effects and to counteract the color lighting that was being reflected from the regular lighting system. It takes very little imagination to understand why such a window attracted attention. The fantastic background and decorative effects accomplished the results, and illustrate why the decorator should give the background primary attention when displaying such a



A Christmas window illustrating how the background and other decorative effects served to draw the attention of the passersby to the window, then to lead the eye to the merchandise.

commonplace bit of merchandise as a gas range.

Now consider another window. In this case a fantastic background representative of a kitchen was used. Casement windows with drapes were contained in the background. The upper walls were of the same cool color that may be found in most any modern kitchen. But the wainscoting! There was where the fantastic effects came in. Who ever saw a real kitchen equipped with wainscoting formed of huge alternating black and white checks like a checkerboard?

The fantasy of such a wainscoting did not seem out of place in a window. In fact it is doubtful that one person out of a hundred would have given the peculiarity of this kitchen's decorations a thought as long as it was in a window. Put it in a home and all of the members of the sewing society would have plenty to talk about.

The attention attracting qualities of the display were contained in the "loud-speaking" wainscoting. In this case two other articles of kitchenware were placed with the range. One was a hot water heater and the other a kitchen cabinet. They gave atmosphere to the display. On the floor were plates of cakes, bread, and other food products baked supposedly in the gas range. The floor was constructed of black and white squares similar to the background; hence the window shopper's gaze was led from the front of the window to the rear where a shift to the right brought the range into the angle of vision. The show card announcing a 30 day free trial of such a range occupied a space that was guaranteed to get first attention as the eye wandered from the front of the window, to the rear and thence to the gas range.

There is still enough of the magic in being able to turn a little knob, apply a match and obtain heat or light from gas appliances, to make it worth while to play upon the imaginations of the public in window displays. There is romance in gas ranges; romance of three types:—

First,—The romance of magic.

Second,—The romance of home life—love on the part of the husband toward the wife and the desire to provide her with conveniences in the home.

Third:—Romance of family—the love of the son for the mother and the joy he obtains through giving her home conveniences.

Romance can be brought out in any of these three types by careful consideration of the backgrounds and decorations used in window displays of gas ranges.

Bible Cake Contest

THE Home Service Bureau of the Kings County Lighting Company in Brooklyn held quite a unique contest on Thursday afternoon, November 1st.

The recipe for the Bible Cake was given out as it appears here and everyone was obliged to look it up in the bible—for instance, in the first line of the recipe—

"2 Lb. Judges V—verse 25. (last clause)."

In this verse it mentions butter—and so on through the entire recipe in this way all the ingredients of the cake are found.

It caused quite a bit of excitement in the neighborhood; every club, Ladies Air Society and everyone on the street would have some bit of gossip about the Bible Cake—and in several instances even the man of the house was busy in the evening helping figure it out.

It was most interesting to see the variety of cakes produced by the single recipe.

The Contest was very successful. There were eighty-nine cakes entered,—many excellent ones.

One cake was individual. It had been baked in a small flat pan to resemble a bible, iced with white icing with a cross of gold on the top, gold lock and gold edged papers. The idea was original and received a great deal of attention.

A few of the cakes were steamed and the judges decided that the women who steamed the cakes should receive some credit, because they had the common sense to improve the cake even tho the recipe said it was to be baked.

Women from all sections of Brooklyn were interested and entered their product. The prizes were liberal, making the effort worth while. The first and second prizes were won by members of the Home Economics Course of the Kings County Lighting Company. Mrs. Bessie Hoadly, 1361 75th Street being the winner of the First Prize of $10.00 in gold, Mrs. Jane Naegle, 6905 11th Avenue, Second Prize of $5.00, Mrs. G. Roynos, 5814 8th Avenue, Third Prize of $2.50. Those receiving Honorable Mention were Mrs. Robert A. Sadler, 1020 President Street, Mrs. Haig, 149 83rd Street, and Miss Beatrice Harahan, 254 73rd Street.

The Newspaper Announcement

It is worthy of note that Miss Beatrice Harahan, winning Honorable Mention, is a young lady who is totally blind but such a handicap does not hinder her from attending the cooking lectures held by the Home Service Bureau of the Kings County Lighting Company. Neither does it keep her from putting into effect the knowledge she has received from these lectures. Miss Harahan has the reputation for making the best crullers and jelly dougnuts of any neighbor for blocks around her.

The judges were:

Miss Martha Riel, Virginia Dare Extract Co.

Miss Boyd, Virginia Dare Extract Co.

Miss Ann Bulger, Special Dietetis Work.

Miss A. M. Gleason, American Gas Journal.

While the cakes were being judged, an entertainment was held in another part of the building.

Miss Nell Howard Enloe of the Pictorial Review Staff gave a most interesting and instructive talk on "The Woman and her Job as Homemaker". Then Jeffrey Ambrose entertained the ladies with some sleight of hand tricks and an excellent ventriloquist act.

Ice cream and bible cake were served. There were 275 women present at the party.

Seventy diplomas and twenty-one class pins were awarded.

Headquarters for Xmas!

WITH the approach of the holidav season, sales managers find it advantageous to show prospective customers the many reasons why modern gas appliances make appreciated gifts and "Old Chris" looks with favor upon gas ranges, heaters, washing machines, etc., and is ready to cooperate with dealers who bring to their sales rooms the Xmas atmosphere. Gas appliances merit intensive advertising, display and demonstration at this season.

Newspaper publicity and show window trims are indispensable sales aids at this time. An important essential is to make the newspaper advertising and show window displays as unique and as interesting as possible. The fact that so many firms are bidding for the trade of Xmas shoppers necessitates "live wire" methods on the part of the distributor of gas appliances, and it is important to keep the practical gift idea in mind during the progress of the Xmas sales efforts.

It isn't advisable to wait for prospective customers to take the initiative, so far as the selection of gas appliances for Xmas gifts is concerned. Competition is a factor which must be given due

consideration. Hardware merchants are featuring extensive lists of practical merchandise. Department stores are conducting intensive sales campaigns at this season, while gift shops and other retail establishments are ready and willing to cooperate with Santa!

Appropriate trimmings and decorations bring the Xmas atmosphere to the sales room, and increase the attractiveness of the appliances on display. Appropriate trimmings play a part in winning the interest and goodwill of prospective customers.

This is the season when practical sales arguments, which are replete with pertinent information, are of maximum value for turning prospects into customers. Salesmen should stress the comfort, convenience and labor-saving features of the equipment.

"I leave very little to the prospective customer's imagination," explained a salesman. "When featuring gas ranges and other equipment for Xmas gifts, I make it my business to prove their desirability for this purpose. Recently a middle aged man was attracted to our sales room through one of our newspaper advertisements. He explained that he had been thinking of buying a nice Xmas present for his wife; but was undecided regarding what to select.

"A few questions on my part brought forth the information that his wife could use a new gas range to advantage. However, after asking the price of an up to date range, he said it was too expensive. Accordingly I got busy and demonstrated its special features, stressing such important factors as the oven regulator, convenient facilities for all kinds of cooking, safety, economy, attractive appearance and the long service assured by its substantial construction. I informed him that the range was guaranteed to give the utmost in cooking and baking comfort, then asked him if he felt justified in depriving his wife of this modern necessity, which would provide so much comfort and satisfaction. He bought the range, because I convinced him it would prove a wise investment, and at the same time make an unusually acceptable Xmas present for his wife.

"A modern washer, for example, is certain to be appreciated by the housewife who has been doing the family washing with obsolete equipment.

"Everything considered, the holiday trade is worth seeking, as this is a favorable time to make the acquaintance of new prospects and win their confidence and goodwill."

Appliances for Christmas

By W. B. Stoddard

IN order to get the Christmas business—especially a share of the money that will be withdrawn from the banks by the various Christmas savings clubs—it is well to concentrate on window display, backed by distinctive newspaper advertising.

The gas range is a gift that will appeal to any housewife—especially a modern range with a heat regulator and the

For Mother's Gift

Santa can make no wiser choice than a Direct Action Gas Range with the Lorain Wheel that gives her hours of leisure.

(Liberal Allowance for your old stove.)

FREE—A 12-pc. set of Aluminumware or a 42-pc. Dinner Set with every Direct Action Range purchased before Christmas

Unless the Regulator has a RED WHEEL it is NOT a LORAIN

LORAIN
OVEN HEAT REGULATOR

The Lorain Red Wheel automatically measures and automatically maintains the heat of the oven.

Knoxville Gas Co.

Knoxville Gas Co. used the following ad that produced results.

Many a family would get a new range if they could dispose of their old one, so this company announced that it would make a liberal allowance for the one in use at present. This is the season when the domestic head of the family wants new cooking utensils and china for the holiday feasts so the Gas Company clinched the sale of a new range by offering free a 13 piece set of aluminum, or a 42 piece dinner set with every stove purchased before Christmas. As one thrifty housewife put it: "If I don't need the china myself, I can get the stove, and give the china to my daughter-in-law for a handsome Christmas present that doesn't cost me a cent."

In addition to the premiums, an allowance for the old stove, and the privilege of purchasing it on the deferred payments plan, the company entered upon a campaign to convince the public of the genuine worth of the modern gas range. They ran a big ad calling attention to their Holiday Cooking Matinee, which was held on Thursday afternoon at 3:00 P. M., on the sales floor. This matinee was devoted to holiday dishes and features, and many helpful suggestions for tasty dishes for the Yuletide were given by the experienced demonstrator. The following menu was served:

Baked Spiced Ham
Baked Potatoes with Cranberry Sauce
Irish Potatoes Rolls
White Christmas Salad and Cake

Hot water is a convenience that everyone appreciates, and the Ruud-Humphrey Water Heater Co., Dallas, Texas, sold many of these gas fired water heaters through their effective campaign. Their big ad had a border of holly, a picture of the water heater at the top, and a series of sketches at the bottom, showing some of the principal uses to which hot water is put. Their argument, surrounded by abundant white space follows:

WHAT SHALL I GIVE?

Sound, common sense made Fourth of July safe and sane. It is also taking the waste and folly out of Christmas giving.

The usable gift is always a source of pleasure—it keeps the Christmas spirit alive indefinitely.

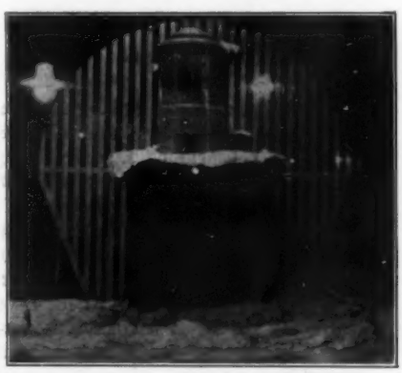
What could be more appropriate than perfect hot water service for your home and family?

A RUUD gives steaming hot water for every purpose, any minute of the day or night, and with no more time or attention than is required to turn a faucet.

A LASTING GIFT

It lasts a life time. Today hundreds of water heaters that were installed twenty-five years ago are still in service.

With each heater goes a neat card to take its place on your Christmas tree.



Dallas Water Heater Display

To attract the men they arranged a window which was floored with artificial snow, in which were laid several brilliant poinsettas. Out of the snow rose a red brick chimney, topped with masses of snow, on which reposed a Ruud water heater. A circular frame-work in the rear was painted green, contrasting well with the red chimney and snow covered heater.

Radiantfire heaters, with their cheerful glow, make especially appropriate Christmas remembrances. Note the human interest advertisement of the W. C. Stripling Co., Fort Worth, Texas, playing up this heater: The big ad showed at the top an old fashioned stage coach loaded down with holiday passengers, and at the bottom a fire-place equipped with a Radiantfire and two children in night clothes taking down well filled stockings:

THE ROAD TO OLD TIME CHRISTMAS JOYS

Build your Christmas happiness around the fireside glow of a Radiantfire. Have a real old fashioned Merry Christmas in the charmed circle of its bright, colorful,

radiant warmth. Let the children on this, their most important morning of the year, dive into the mysteries of their overflowing stockings in the jolly, festive radiance of its flaming glow. Assure yourself that your Yuletide festivities this year will be free from annoying interruptions and anxieties about heat, the nuisance of fuel handling, dirt, ashes and trouble. Put the unequalled convenience of a Radiantfire to work for your comfort—let it be the means of enjoying such a Christmas as you never had before.

The balance of the ad was taken up with descriptions and prices of the different style heaters.

They backed up this clever printed advertising with a holiday window display. There was a huge circular panel of red, blue and green in the background, on which were depicted silver trees. Scattered over the floor were five different types of Radiantfire and a card suggested: There Is a Type of HEATER for Every Household Enjoy the Holiday Season by Its Cheerful Glow.

This window sold heaters

A Striking Display

Portland, Oregon, Stages Interesting and Convincing Heating Propaganda

By O. B. Server

ONE of the most striking illustrations of the "before and after" is what I beheld as I passed along the magnificent new building of the public utilities in Portland, Oregon. One-half of this beautiful building is given over to the Gas Company and while there are no enclosed show-windows as is customary in stores nowadays, on account of the floor being below the street surface, this particular feature lends itself to large displays which could not be gotten into any window.

The photograph which accompanies this article gives one an idea of the size of the display, for in the converted basement room stands the Radiantfire and mantel, the American Radiator under the window, the Gas-fired Boiler and then several articles of furniture besides a billiard table. By the way, the green cloth and the red balls of the billiard table were the outstanding color features which compelled my attention while the adjoining "chamber of horrors" reminded me of days gone by. It evidently made the same impression on others for I took particular pains to watch the people as they were attracted to the display and invariably would come away with a grin after looking at the jungle.

As explained by the signs, the "chamber of horrors" was what the basement looked like before Gas heating came in, while the room with the billiard table, Turkish rug on the floor, pretty curtains, marble statuette, two reading lamps and oil paintings was advertised as being the extra room you gain in your house when you install Gas heating and do away with the coal bin and wood pile.

I have seen many illustrated ads of the fat man who grew thin, of a thin woman who grew plump, of the bald man who grew hair, and what-not, but of all the "before and after" illustrations, this vivid description of the dirty basement and the converted one certainly led out in convincing attractiveness.

INDUSTRY LOOKS AT THE TOWN

Towns look with covetous eyes upon new industries, but the other side of the question—what does industry expect of the town—is raised by William Butterworth, President of the Chamber of Commerce of the United States, in an address before the National Recreation Congress.

"Industry," he said, "is generally alive to the bearing recreational opportunities have on the location of its factories. One of the field secretaries of the Playground and Recreation Association, discussing this matter with a chamber of commerce secretary in a large Pennsylvania town, was told that during the past two years or more, five out of every six industries with which he had corresponded had included among the questions asked—'What park and public recreation facilities have you?'

"Recently the head of a large manufacturing concern in Chicago was considering moving his plant to a certain Indiana city. One of his leading questions to the chamber of commerce was—'Outside of your beach and park, what recreation facilities are there for my employees, who will number 900, of whom 250 play golf?' This, as my informant pointed out, was not so good for the city in question.

"When the various economic advantages of recreation to the municipality, the tax payer and the property owner, industry and all of us as individuals are fully recognized, our citizens will no longer delay in bringing their programs to the highest standards of efficiency."

Association Activities

A. G. A. and affiliated gas associations' sectional activities and convention calendar

New A.G.A. Course in Domestic Gas Salesmanship Makes Auspicious Start

The fact that over one thousand enrollments in the new A. G. A. Course in Domestic Gas Salesmanship have been sent in since its official start on October 15th. augurs well for the success of the undertaking. Many of those taking the Course are connected with medium and small size companies, although the larger organizations are beginning to respond in an encouraging manner. It is estimated that upward of three thousand will be enrolled by the end of the first year.

A partial list of the companies having substantial enrollments are as follows:

Bronx Gas & Electric Co., Bronx, N. Y; Bryant Heater & Manufacturing Co., Cleveland, Ohio; Central Indiana Gas Co., Muncie, Ind.; Central Union Gas Co., New York, N. Y.; Columbus Gas & Fuel Co., Columbus, Ohio; Consolidated Gas Co. of N. Y., New York; Cumberland & Allegheny Gas Co., Cumberland, Md.; Dixie Gas & Fuel Co., Beaumont, Texas; East Ohio Gas Co., Cleveland, Ohio; East River Gas Co. of L. I. City, Long Island City, N. Y.; Empire Gas & Electric Co., Geneva, N. Y.; Fall River Gas Works Co., Fall River, Mass.; Hartford Gas Co., Hartford, Conn.; Indiana Gas Utilities Co., Terre Haute, Ind.; Kings County Lighting Co., Brooklyn, N. Y.; Knoxville Gas Co., Knoxville, Tenn.; Laclede Gas Light Co. St. Louis, Mo.; Lake Shore Gas Co., Ashtabula, Ohio; Manufacturers Light & Heat Co., Pittsburgh, Pa.; Nashville Gas & Heating Co., Nashville, Tenn.; New Haven Gas Light Co., New Haven, Conn.; Northern Indiana Public Service Co., Hammond, Ind.; Northern Union Gas Co., New York, N. Y.; North Shore Gas Co., Waukegan, Ill.; Old Colony Gas Co., E. Braintree, Mass.; Public Service Electric & Gas Co., Newark, N. J.; St. Louis County Gas Co., Webster Groves, Mo.; San Antonio Public Service Co., San Antonio, Texas; Seattle Lighting Co., Seattle, Wash.; Southern Counties Gas Co., Los Angeles, Calif.; United Natural Gas Co., Oil City, Pa.; Westchester Lighting Co., Mt. Vernon, N. Y.

Attesting to the enthusiasm with which the Course has been received is the fact that, without any solicitation, a number of those taking the Course, as well as Gas Company Commercial Managers and others, have written to the Association commending them for the high quality and bright outlook for the undertaking.

Incidentally, enrollments can be made at any time, but it is suggested that a sufficient number of students should be enrolled at a given time to permit the holding of the sales meetings in connection with each unit of the Course.

The Association has published a complete list of interesting material describing in detail what the Course contains, how it operates and what it will do for the gas appliance salesman. Copies of this material may be had by addressing J. W. West, Jr., American Gas Association, 420 Lexington Avenue, New York City.

CONVENTION CALENDAR
DECEMBER

11 Mid-Year Meeting Pennsylvania Gas Association, Harrisburg, Pa. George L. Cullen, secretary, Pennsylvania Gas Association, Harrisburg, Pa.

Committee Reports on Economic Aspects of Laboratory Approval Seal

At the meeting of the Executive Board and Advisory Council in Atlantic City in June, the Committee on the Economic Aspects of the Blue Star Seal made an exhaustive report embodying certain conclusions and general recommendations. The Executive Board at that time accepted the report of the committee to date and then sent it back to the committee, suggesting that it work out in detail the general recommendations which the committee at that time made in relation to the Blue Star Seal. The committee has worked further on that and recommends the following:

First, that the symbol or insignia of a gas appliance indicating that it has been tested and approved by the testing laboratory, shall hereafter be referred to as the Laboratory Approval Seal and not as the Blue Star Seal.

Second, that hereafter in connection with the appearance of that symbol on any gas appliance, there shall be used along with it a legend reading substantially as follows:

"This Laboratory Approval Seal is a guarantee of compliance with basic national requirements for safety—American Gas Association, Inc."

Third, it is recommended that the manufacturers in presenting their appliances for test by the testing laboratory, shall hereafter, by way of making these recommendations effective, be required to agree that in their sales work and exploitation of their appliances they shall comply with the findings that have been made as to the use of the legend or the interpretation of the legend, and shall not exploit the seal as a commercial mark of quality.

In order to give further effect to these recommendations, certain steps have already been taken and others of similar character will follow, to give publicity to these subjects. The Commercial Section is prepared to revise as soon as the committee's recommendations are approved, all of the advertising matter and literature now out, which was prepared in connection with the Blue Star Home Campaign. The Commercial Section will also include in the pending or current course in salesmanship training, a chapter on the significance of the Laboratory Approval Seal, and hence the existence thereof.

The Publicity and Advertising Section has in hand a standard lecture on the true significance of the Laboratory Approval Seal which will be printed in the A. G. A. Monthly and circulated. Copies of it will be available for the use of manufacturers and gas companies and all others who are concerned in the exploitation of or the interpretation of the seal.

The committee further recommends that the Laboratory Managing Committee, in conjunction with Headquarters and under the advice of counsel take such steps as may be necessary to copyright or otherwise protect the Laboratory Approval Seal.

It is also recommended for the consideration of the Manufacturers Section, that the manufacturers of gas appliances constitute themselves a "vigilance committee", so to speak, and check up on how the exploitation and use of the Laboratory Approval Seal is carried on by manufacturers, by dealers and by gas companies; and that they report infractions of the general policy that has been agreed upon, or report the misuse of or the misinterpretation of the Laboratory Approval Seal to Headquarters, such reports to be made available to the Laboratory Managing Committee which in conjunction with the Association Counsel shall take such steps as may be deemed expedient or possible to prevent and stop such misuse of the Laboratory Seal, subject of course, to the Executive Board's approval.

In relation to all of these matters where it is recommended that the Laboratory Managing Committee be charged with certain responsibilities, it is assumed that action by that committee as to policy and practice shall always be subject to the Executive Board's approval. With that understanding, it is recommended that the Laboratory Managing Committee be charged with the responsibility of putting into effect the recommendations which have been made in relation to the future use of the Laboratory Approval Seal, and that "putting into effect" shall include the fixing of a time when the new use of the seal with the legend heretofore described, shall become effective.

Stephany appointed Secretary of Natural Gas Department

The appointment of E. J. Stephany, of Pittsburgh, Pa., as secretary of the Natural Gas Department of the American Gas Association, was recently announced by Oscar H. Fogg, President of the A. G. A.

At the time of his selection, Mr. Stephany was assistant to the manager of sales and service of the Philadelphia Company. He has been with the Philadelphia Company or its subsidiary, The Equitable Gas Company, for ten years. Mr. Stephany is also secretary of the Pennsylvania Natural Gas Men's Association, an affiliated organization of the American Gas Association.

"Mr. Stephany brings to this important position a particularly broad experience in the gas industry," Col. Fogg said. "He has served in various capacities for several companies for approximately 15 years, his work during this period covering all departments of the gas company. In addition he has given loyal service to the A. G. A., and his committee work has not only been valuable and appreciated, but it has also given him an accurate picture of the organized gas industry."

Samuel W. Meals, chairman of the Natural Gas Department, said that the appointment of Mr. Stephany would meet the approval of all members of the Department. He spoke as follows:

"The new secretary has had a well-rounded experience in the natural gas industry, and he has a large circle of friends in the natural gas territories. As Chairman of the Department, I take great pride in presenting Mr Stephany to the members. I ask that close co-operation be given him, Major Forward, and Col. Fogg, for it is my firm conviction that we will see even more benefits of the recent amalgamation than we have.

"On behalf of the members of the Department I would like to express my appreciation of the work of Thomas Scofield, who has served as acting secretary for the past several months.

E. J. Stephany

"The new secretary has given active service to the A. G. A., his record including membership on important committees of the Commercial, Industrial Gas, and Publicity and Advertising Sections." Major Forward said, "He was vice-chairman of the Industrial Gas Section when that Section was organized several years ago and since the formation of the A. G. A. has served on at least two important committees every year. During the past year he was chairman of the Space Heater Approval Requirements Committee, Chairman of the Commercial Section's Domestic Cooking Committee, a member of the Commercial Section's Merchandising Committee, and also of the Industrial Gas Section's Rate Committee."

Mr. Stephany is 36 years old. He is a graduate of the University of Wisconsin, Mechanical Engineering, 1913. After graduation he served as cadet engineer for a year and one-half with the Western United Gas and Electric Company, Aurora, Ill. He worked in all plant departments during this time, and then was made assistant commercial manager of the company, which served 64 towns with gas, electricity, or steam heat. In 1916-17, he and two others went to Murphysboro, Ill., to start the Southern Illinois Gas Company. Franchises were secured in seven towns and high pressure gas lines installed. Mr. Stephany was commercial manager of this group.

Late in 1917 Mr. Stephany returned to Aurora as commercial manager, and in 1918 went with the Equitable Gas Company, Pittsburgh, Pa., as industrial gas engineer. He organized and headed the sales department of the Equitable. For the past two years he has been assistant to the manager of sales and service of the Philadelphia Company, the parent company of the Equitable Gas Company.

Coal Conference Furnishes Valuable Technical and Economic Facts

Pittsburgh gathering stimulates interest in fundamental studies and in improved industrial development of coal processing and coal products

NEARLY 2000 persons interested in coal gathered for the Second International Conference on Bituminous Coal which was held under the auspices of the Carnegie Institute of Technology in Pittsburgh the week of November 19 to 24. A very broad picture of the developments in coal utilization was presented on an international basis through more than 125 formal papers and much illuminating discussion.

Among the outstanding topics of interest to gas and coke men of the United States were the reports on the fundamentals of carbonization, new developments in coal products, cleaning of coal, coal liquefaction, and interrelation of coal processing with coal utilization for power, process steam, and industrial heating.

Because of the tremendous mass of the material presented at the Conference it is altogether impossible to present an adequate picture of even the worth while contributions. Only a few high lights can be reflected in this report and from them it is hoped that sufficient interest will be stimulated to encourage many readers of the JOURNAL to procure the full proceedings, to be published by the Institute in two volumes (at $15) early next year. The study of both the technical and economic contributions which will be presented in full in these two volumes will be well worth while for any gas-works or coke-plant management.

Low-temperature carbonization was the main theme of seven sessions of the Conference, the largest number devoted to any one topic. But most of the discussion of these sessions related to particular processes or the theories of the authors regarding the cooking phenomena which have a bearing on their particular proposals for carrying out low-temperature carbonization. It was notable that throughout the discussion of low-temperature processes there was increasing evidence of an appreciation that a good grade of solid domestic fuel must under most conditions be the prime objective of low-temperature coking plants.

In this connection it is of interest to note that the American Radiator Company has been making a careful study of domestic heating equipment to burn coke. C. W. Brabbee, director of their research group, reported on a new device which is recommended for this purpose. It is believed that this new equipment will afford without greatly increased installation cost a very high efficiency at all rates of firing, complete combustion, and very low stack-gas temperature, all of

which will contribute to economical housebeating.

So far as the reports dealt with processes now in use in the United States there were no new disclosures of commercialization which have not already been adequately reported, especially by the Carbonization Committee of the A. G. A. The report of Parr on the contrary, dealt almost entirely with the fundamental phenomena and outlined clearly the way in which the character of the process changes as the temperature rises during coking. Following the drying of the coal, which takes place at 100°C and below, there is a period during heating-up which amounts to conditioning. This takes place between 100° and 300° or higher. The upper limit of temperature for the conditioning period varies according to the rate of heating during this interval. During the conditioning period there is a rearrangement and a breaking up of compounds, accompanied by endothermic reactions which give off carbon dioxide and water.

Exothermic Reactions

At the end of the conditioning period the softening of the coal begins and the exothermic reactions of true carbonization take place. The character of these reactions and the character and proportion of the products depends largely upon the rate of heating during the conditioning period and the completeness to which conditioning is allowed to proceed. Parr also pointed out that the ease of ignition of the coke depends very largely upon the maximum temperature to which it has been subjected. Cokes which have not been heated above 750° C are very readily ignited, but cokes which have reached higher temperature during processing are less reactive, and the rate of reactivity decreases very rapidly with increase in maximum processing temperature.

By-products from coal are due to be extended into every field of industry, if one might believe all of the advocates of new processes who participated in the discussions at Pittsburgh. Not content with the thousands of coal-tar products and the numerous important uses of present coal derivatives, some authors took their listeners even so far afield as to forecast the making of an artificial rubber by synthesis from coal hydrocarbons. Much less remote, and of much greater importance to the gas and coke industries, are the prophesies with respect to the primary products, tar and ammonia.

It is evident from the discussion which took place that by-product ammonia from coal is to have as a competitor huge amounts of the synthetic product. Some forecasts would indicate a doubling of the world out-put of inorganic nitrogen for fertilizer use within the next four or five years. However, none of the forecasters failed to realize that ammonia obtained as a by-product from coal is likely to find its appropriate place in the markets in competition with these newcomers.

Increased impetus is given to the recovery of ammonia, either as a liquor or as anhydrous ammonia made from liquor, by the proposals of MacDowell. He forecasts the time when much of the ammonia, instead of being converted into sulphate at the coke works, would be transported to the fertilizer plant as liquor or in anhydrous form combination with phosphoric acid or acid phosphate into more concentrated fertilizer products. It is well known that the Armour Fertilizer Company, of which MacDowell is president, is using large quantities of ammonia liquor in this fashion with considerable technical and commercial success. This development makes it appear that the small works which can recover liquor, but which cannot justify the investment of a sulphite plant, may still find satisfactory market for its by-product ammonia.

Selection of coal for coking usually takes place with very definite restriction on the sulphur content of the coal. F. W. Speer, in his paper on gas purification in relation to coal sulphur, raises the very interesting question as to whether it is not economically sound to use coal of higher sulphur content because of the recent development of improved methods of liquid purification of gas. He points out that the answer will often depend upon the ease with which sulphur can be removed from the coal by washing. Where cheap and easy washing procedures will reduce the sulphur content of the coal to one per cent or less, then such a method may still be justified; but in other cases, especially with those coals which are difficult to wash but yield most of their sulphur in the gas rather than in the coke, there is considerable advantage in using high-sulphur coal with improved methods of gas purification.

Sperr points out that, of course, this development usually cannot take place in plants which must produce metallurgical coke of low sulphur content. Furthermore, in the case of coal to be used for water-gas manufacture the presence of the sulphur may so affect the fusing point of the ash as to render the change proposed impracticable. In the case of producer gas manufacured for industrial heating use, in which case the high sulphur content of the gas can often be ignored, substantial advantage may accrue from the proposed change.

The use of coal in the manufacture of process steam or for power purposes was of course, one of the major topics of discussion at the Conference. In this field, too, the gas and coke industries, as big users of boiler fuel, have a substantial interest. They should note particularly that there is evidence of a vigorous competition impending between stoker-fired boilers.. It is evident that the improvements in powered-coal firing have stimulated very vigorous work by the stoker builders and the present-day equipment has benefitted thereby.

Powdered Coal Problems

In the use of powdered coal all speakers seemed to agree that there are at least two important problems: First the provisions of adequate combustion space (substantially greater than is required for either gas or oil firing); and, for many plants, some system of fine ash control. In both of these respects gas-fired boiler equipment is at an advantage, and one speaker went so far as to propose that coal should be gasified in the producer and that producer gas should then be burned under the boiler, establishing a two-stage system of steam generation.

An interesting variation of powdered-coal development was suggested by the report of Goosens, who has made a careful cost analysis of the means for transporting powdered coal. This engineer's investigation indicates that it is economically practicable to move powdered coal for distances over ten kilometers (six miles) and that up to this distance pipe line transmission is probably cheaper; for much longer distances movement in railway cars of special design seems to be cheaper.

The business aspects of coal use in all of its ramifications were very effectively brought out by zur Nedden, who made a clear analysis of the relation between investment required, the cost of the coal, and the value of the products. He reached the general conclusions that "The higher the quality of the bearer of energy into which you transform coal the greater is the amount of capital which you must invest per ton of annual through-put." The most striking exception which he emphasized was the relatively low investment required for coal liquefaction plants because of their high capacity load factor. This method of analysis of an industrial situation is very suggestive of the study which is needed in many American gas plants where excessive capital is one of the principal economic obstacles to profitable operation.

The possibility of working out combination gas and electric plants in which the maximum over-all thermal economy would be achieved was discussed by several speakers. A. R. Smith, of the General Electric Company, described rather a complete analysis which he has made of these possibilities, including a proposed new type of plant. In this plant the gas generating equipment and boilers are all located out of doors and a very large part of the equipment would be designed for automatic control. In general this analysis gives the impression of seeking only to secure the maximum thermal economy and the lowest cost per kilowatt-hour. Figured on such a basis conclusions may not be generally acceptable among those in the gas industry who believe that the B. t. u. in gaseous form is a more important energy unit to consider in making economic forecasts. However, there is considerable evidence, not only in this paper by Smith, but elsewhere, to indicate that the possibilities of combined plants may require further analysis and that comparisons such as are here described are worthy of careful attention.

Combined Plant Possibilities

The thermal advantages, as well as the improved operating conditions, which result from dry quenching of coke furnished the basis for careful discussion of this subject by D. W. Wilson. His analysis of an actual American plant includes a satisfactory means for estimating investment and figuring steam costs. In the example cited the total cost of steam, including operating expense and capital charges, was found to be 11.58 cents per thousand pounds of steam generated. It is pointed out by Wilson that a variety of indirect advantages accompany the installation of such plant and these contribute still further toward the reduction in such waste-heat steam-recovery costs. [A further report on the economic and engineering features of these processes is in preparation and will appear in an early issue of the JOURNAL. Editor.]

The program at Pittsburgh was particularly stimulating in making readily

Announcing

A New General Catalogue of American Meter Company's complete line of gas meters and allied apparatus will shortly be ready for distribution.

This book will enable ready reference to all products. Its contents will show forcibly what customers have long known, that American Meter Company factories offer complete measurement and apparatus requirements for every type and condition of service.

AMERICAN METER COMPANY
JOHN J. GRIFFIN & SON
HENRY R. WORTHINGTON
MARYLAND METER WORKS

P. PFLUEGER & CO.
METRIC METER WORKS
NATIONAL METER WORKS
SIMPLEX METER WORKS

available to American industry the recent developments in foreign countries. The program was, indeed, international in fact as well as in title. Among the large number of foreign contributions worthy of note only a few can be cited to illustrate types of information that can be found in the full proceedings.

Cooperative Coal Purchasing

The cooperative purchasing of coal by gas works has been recently developed in Denmark. In that country a cooperative association has worked on methods of testing and the establishment of specifications in order to facilitate securing of the maximum advantage for all member companies. As yet the work has not gone forward sufficiently to cover all phases of coal purchasing, but P. E. Raaschou, who reported on the work, indicates that large advantages have already accrued from it.

One of the British contributions from E. W. Smith, Technical Director, Woodall-Duckham Companies, London, presents an elaborate cost analysis, adapted primarily to English conditions, on both capital charge and operating expense for coal-gas manufacture. He concludes that, at least under conditions prevailing in England, profits are made from the manufacture of coal gas, but are lost in the less efficient operations of distribution and sale. He concludes also that over a wide range of carbonizing conditions and a wide range of heating value of gas the total cost of gas per therm. (100,000 B.t.u.) does not vary materially.

Discussing the gas and tar industries in France, Jean Bing points out the development which has been taking place during recent years in that country. It is interesting to note that in France there are several important tendencies which parallel closely similar trends in the United States. Among these are the tendency toward consolidation of small companies into large units and an increased dependence upon coke ovens for gas manufacture.

Long Distance Transmission

This last tendency is also reflected in Germany, where a large-scale effort is under way arranging for the transmission of coke-oven gas by long-distance pipe lines from the Ruhr district to industrial and municipal areas. Alfred Pott, describing this development, stated that by the end of 1929 there would be nearly 600 miles of pipe line available to carry gas from the Ruhr district coke ovens to municipal areas having a population of at least 10,000,000. His report describes in considerable detail the methods of transmission through these welded lines at pressures analogous to those used in natural-gas transmission practice in the United States.

Trade Catalogs

Bulletin No. 43, "Carbureted Water Gas," published by Semet-Solvay Engineering Corp., New York City, contains some worthwhile information and data on the subject of Water Gas manufacture. This well illustrated bulletin will be sent upon application to the above company.

Jas. B. Clow & Sons, Chicago, Ill. have issued an attractively illustrated brochure telling of some of the latest developments in Clow Gasteam heating. Copy will be sent upon request.

Catalog No. 6, issued by Merco Nordstrom Valve Company, 343 Sansome St., San Francisco, Cal. is a well illustrated book of some 142 pages, containing much valuable data and description of their products. Copy will be sent upon request to the above address or their nearest agency.

Helme & McIlhenny's 80th. Anniversary Bulletin contains pertinent information relative to meter testing as well as an illustrated description of their A and B type gas meters. For copy address above company at Seventeenth and Clearfield Sts., Philadelphia, Pa.

The Bailey Meter Company, Cleveland, Ohio, has issued a new bulletin No. 35 entitled, "Bailey Gas Meters" in which is described a number of different types of meters for the measurement of producer gas, coal gas, water gas, natural gas, coke oven gas, petroleum gas, oxygen, acetylene, air, etc. The application of meters to gas-fired boilers, water gas sets, open hearth furnaces, blast furnace, turbo blowers and many other services, is clearly illustrated and described. The principle upon which the Bailey Meters operate is clearly shown by numerous cross-sectional and cut-away views. A long list of users is included on the last two pages of the bulletin.

"Storing Gas at High Pressure," a booklet just issued by the Chicago Bridge & Iron Works, describes and illustrates the use of THE HORTONSPHERE for high pressure gas storage.

In addition to the brief text matter this booklet contains a table of standard capacities and detailed tabular costs of high pressure transmission. One interesting feature revealed is that HORTONSPHERES ranging from 58,000 to 385,000 cubic feet capacity require only 17 to 41 cubic yards of concrete for foundations.

Copies of the booklet will be sent by the Chicago Bridge & Iron Works, 37 W. VanBuren St., Chicago, Ill., on request.

The Bristol Company, Waterbury, Conn., have recently issued a catalog, "Long Distance Transmitting and Recording System". This catalog, No. 1900, describes the application of their electric system to indicating and recording, at a distance, pressure, levels of various liquids, and other similar varying phenomena. The unit and its varied applications are illustrated and described and specimens of charts are shown. Copy upon request.

A revised edition of bulletin 4D, describing and illustrating Connersville Meters has just been issued by Connersville Blower Co., Connersville, Ind.

In this edition is a brief history of the development of the double impeller type of blower or pump and of the rotary displacement meter. Also a description of the method of measurement, illustrations of Connersville features of design including the very simple, yet effective bearing mounting, the rectangular inlet box, the standard register that reads direct in cubic feet, the P. V. T. T. Recorder, that gives a complete record on one chart of the volume, pressure, temperature and rate of flow.

There is also a brief description of the Connersville Tandem Meter for extreme accuracy of measurement over a wide range in capacity, and of the Connersville Demand Meters that record the maximum consumption on an hourly or a thirty minute interval.

Catalog No. 80 has recently been issued by Leeds & Northrup Co., Philadelphia, Pa. This well illustrated catalog describes L & N Resistance Thermometers as applied to various industrial processes. Advice is given as to the proper selection of equipment, the theory of electric pyrometry is outlined, and a typical chart is depicted. A copy will be sent upon request.

Bulletin 200, "Electrical Precipitation," issued by Research Corp., 25 West 43rd. St., New York City, describes the Cottrell Process as applied to the precipitation and recovery or removal of solids or liquids from air or gases. The theory is outlined and illustrated, and a section, Bulletin No. 202, is directly concerned with the use of the equipment in detarring Manufactured Gas. A copy will be sent upon request.

B. P. Lientz & Company, 3409 E. 18th. St., Kansas City, Mo.,h ave isued a catalog, "Combustion Engineering Service and Equipment," which contains much of interest to gas men. Various gas burners are described, as well as oil pump sets. Several valuable pages of curves and gas engineering data are included and the whole is well illustrated. Copy upon request.

The December issue of "U. S. Cast Iron Piper," published by the U. S. Cast Iron Pipe and Foundry Company, Burlington, N. J., contains several items and articles of interest to gas men. Among these are "Economy in Gas Distribution," and a short article having to do with improvement in traffic conditions by way of two-main systems.

KNOWN FACTORS CUBIC FEET IN METER VALUE

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MEASUREMENT ENGINEERS
CUBIC FEET

D. MCDONALD & CO.
METRIC METAL WORKS
NATHANIEL TUFTS METER WORKS
PACIFIC METER WORKS

LIST OF PRODUCTS

American Meter Company

INCORPORATED

METERS, DOMESTIC AND INDUSTRIAL SERVICE

Meters, A Type (*Tinned Steel Case*)
" B Type (*Tinned Steel Case*)
" C Type (*Tinned Steel Case*)
" Prepayment (*Tinned Steel Case*)
" Metric Iron Case (*Low, Medium & High Pressures*)
" Metric Iron Case Prepayment

METERS, DEMONSTRATION (Tinned Steel Case and Metric Iron Case)

Meters, Glazed Exhibition

METER DEMAND DEVICES

Empire Limiting Demand
Indicating Demand
Recording Demand
Maryland Demand

METERS, LARGE VOLUME MEASUREMENT

Meters, Linderman Orifice
" Westcott Orifice
" Wet Station

METER MAINTENANCE AND ACCESSORIES

Meter Connections
" Diaphragms
" Repair Parts

APPARATUS, LABORATORY AND EXPERIMENTAL

Calorimeter, American
Cubic Foot Bottles
Gassing Machines
Gasometers
Gauges, New Improved American Siphon
" Standard Siphon or "U"
" Superintendent's Pocket
Governors, Double Dry
" Laboratory Dry
" Wet Calorimeter
" Pressure
Meter Provers
Meter Testers, Hydro-Pneumatic
Meters, Wet Test 1/10 cu. ft.
" " " 1/20 cu. ft.
" " " Large Capacity (5-80 to 100-1200 cu. ft.)
Specific Gravity Apparatus, Schilling
" " " Bureau of Standards
Stop Clock
Stop Watch
Sulphur and Ammonia Test, Referee's
" " " " Young's
" " " " (H_2S) Chimney Type
Thermometers, Calorimeter
" Condenser
" Meter Prover
" Wet Test Meter

APPARATUS, SERVICE

Filters, Denver Gas
" R. G. T.
Furnaces, Gas Soldering
Gauges (*see Apparatus Laboratory*)
Index, Demonstrating
Meters, Critical Flow Prover, for H.P. Field Testing
" Demonstration
" Portable Test 20 cu. ft.
" " " 85 cu. ft.
" " " 5 and 10 Lt.
Thermometers (*see Apparatus Laboratory*)

AMERICAN METER CO
MEASUREMENT ENGINEERS
CUBIC FEET

SERVICE CLEANERS

Drip Pumps
New American Service Pump
Providence Vacuum Tank

Research Kitchen of American Stove Company, Cleveland, Ohio; Dorothy E. Shank, Director

"The American Gas Association, at its convention at Atlantic City early in October, pledged the industry to a maximum research program for the future with a view to expanding both the industrial and domestic fields."

"DOMESTIC COMMERCE". U. S. Department of Commerce.

SEVERAL YEARS AGO American Stove Company pledged itself, through the establishment of a Research Laboratory and a Research Kitchen, to a policy of continuous research toward the end that its domestic gas appliances might reach the highest possible point of perfection, thereby benefiting the gas industry as a whole, the gas consuming public and American Stove Company.

Exterior of Research Laboratory of American Stove Company, St. Louis, Mo.

AMERICAN STOVE COMPANY

801 Chouteau Avenue • • • • St. Louis, Mo.

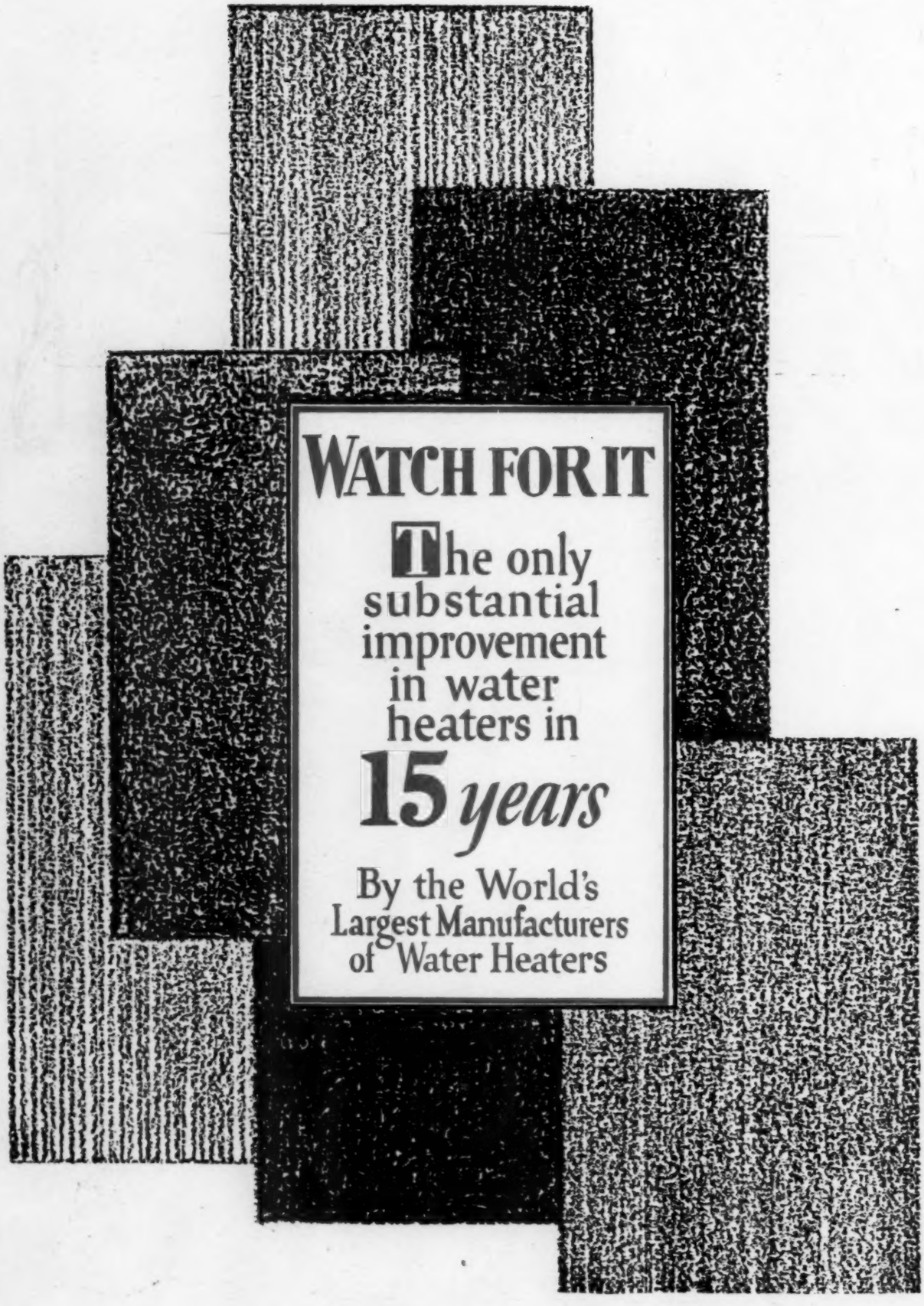
LARGEST MAKERS OF GAS RANGES IN THE WORLD

These are the Six Famous Brands of Red Wheel Gas Ranges:

DANGLER • CLARK JEWEL • QUICK MEAL
DIRECT ACTION • NEW PROCESS • RELIABLE

LORAIN

RED WHEEL


WATCH FOR IT
The only substantial improvement in water heaters in
15 years
By the World's Largest Manufacturers of Water Heaters

Equipment News

New Purifier Tray

A new type of purifier tray which, it is claimed, successfully resists the corrosive action of gas is being manufactured by the Semet-Solvay Engineering Corporation of New York, under exclusive contract with the designer.

The new tray is the invention of F. C. Wellington, of Chicago, for several years superintendent of the Illinois Power Company's gas plant at Springfield, Ill. Mr. Wellington designed a tray to successfully withstand the corrosive effect of the sulphur which is taken out of the gas in the purification process. Sulphur has always shortened the serviceability of purifier trays by eating away the bolts, screws or nails used in assembling.

The new type tray for which patents are pending, contains absolutely no metal. It is assembled by means of wooden gowels, tightly fitted and trimmed flush with the surface of the boards. When the tray becomes moist during service and the wood expands, the assembly, instead of being damaged, is only made tighter. Trays of this construction which were recently inspected after having been in service almost two years, were found to be in perfect condition, requiring no repair whatever.

Completely Assembled Barber Conversion Burner

The Cleveland Gas Burner & Appliance Company, Cleveland, Ohio, announce that they are now ready to place the Barber AUTOMATIC Gas Burner on the market.

This new burner, which the above company's engineers have been working on for a long time, claims many interesting and practical advantages. Some of these as well as construction and assembly details are described herewith.

The new burner will be completely assembled and equipped with gas pressure regulators of proper size; automatic safety pilot; special Barber Jet Pilot for each burner unit, automatic electric gas valve; form fitting and adjustable baffles for baffling the circulation of air in the combustion chamber; a specially designed Gas Distributor Header, providing equal and unobstructed distribution of gas to all the units on the burner; a specially designed Manifold, providing ample capacity for all burner units, and permitting a full sweep of the gas with an absolute minimum of friction; a unique arrangement that permits the individual units on each burner assembly to be contracted or spread, so as to meet the exact requirements of position in the fire box; automatic draft door regulator, to control the entrainment of secondary air; and automatic room thermostat.

There will be three standard sizes of these burners for round boilers and furnaces and each type or size will be adjustable without change of parts or fittings, to fit the grate diameter for which each burner is specified. A concise but thorough instruction manual is being prepared for distribution.

Carbide Light Permits Choice of Fuels

The Alexander Milburn Company of Baltimore announces a new kind of carbide light which will especially operate, it is claimed, with either lump or carbic cakes.

This addition to the Milburn line is to provide a light or welding generator, with extra gas storage space and which does not restrict the user to any particular kind of carbide.

The center of the carbide container is a cylinder which holds the carbic cakes and which is equipped with the proper facilities for taking care of the sludge. The outside of this container is filled with conical pockets for the reception of ordinary carbide.

In designing the new lights, the same claims which characterize the standard Milburn Lights have been retained, such as the fact that the Milburn Light cannot be overcharged; it can be recharged without changing the water; has the automatic burner cleaner which cleans the burner while the light is burning; has low operating cost (only 3-1/3c per hour for 8,000 candlepower, using ordinary carbide).

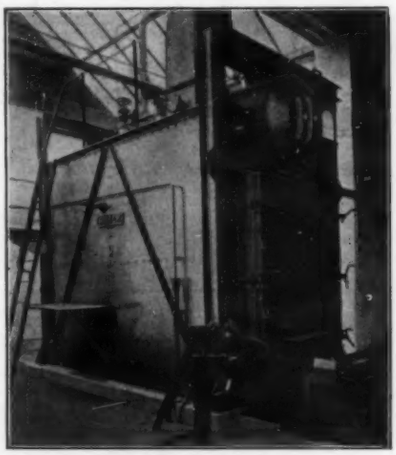
Dry Quencher for Small Plants

The Dry Quenching Equipment Corporation has now developed a new type of equipment designed to meet the coke quenching requirements of smaller gas and coke works. This Dry Quencher, known as the Type C, presents the following claims:

Simplicity of design and operation, careful handling of coke, and low investment cost; and it includes all the advantages of Dry Quenching secured in large installations. Like all Sulzer Dry Quenching plants, it eliminates the use of quenching water with its attendant clouds of corrosive vapors; it permits the production of dry coke free from breeze with the consequent advantages for use as producer or water gas fuel or in the domestic trade; and it produces about 800 lbs. of high pressure steam per ton of coke cooled.

The equipment and operation are as follows:

The hot coke is put into a special coke car lined with cast iron plates. The bottom of this car is built as a gas distributor allowing a mixture of inert cooling gas to blow through the coke in an upward direction. The quencher consists of a vertical water tube boiler with an upper and a lower drum. The two vertical sections of tubes are arranged in such a way that the coke car can be placed between them. The boiler is surrounded by an airtight steel casing lined with brick and having an air-tight door on one side for the introduction of the coke car. On the end of the quencher opposite this door, there is a motor driven fan which forces the cooling gas into the bottom chamber of the coke car and from there through the distributor upward through the coke. The gas then passes alongside the tubes, downward to the lower drum on all four sides of the car and back to the fan. The connection between the bottom chamber of the coke car and the pressure duct of the fan is made automatically by means of a flexible coupling of special design. After the coke is cooled down to about 450° F., the coke car is pulled out of the quencher and emptied into the hopper of a skip hoist or onto a conveyor belt.



Full particulars will be sent upon request to Dry Quenching Equipment Corporation, subsidiary of International Combustion Engineering Corp., 200 Madison Ave., New York City.

Walworth Cast Iron Screwed Pipe

Walworth Company, 51 East 42nd St., New York, announce a line of new pipe. This pipe which is threaded is of a special alloy cast iron is claimed to have

tensile strength from 50 to 100 per cent greater than ordinary cast iron pipe. It is further claimed that this pipe can be cut and threaded anywhere within its own length with either hand or power tools.

It is stated that this pipe bursts, in four inch size, under hydraulic pressure of approximately 4,000 lbs; three inch pipe bursts at 4,200 to 4,800 lbs. pressures.

The pipe is furnished with threaded ends clean-cut and gauged to American standard pipe thread requirements. All pipe is shipped with thread protector on one end and alloy coupling on the other. Plain end furnished on special orders.

It has the same O. D. and I. D. as extra heavy steel or wrought iron pipe Walworth Cast Iron Screwed Pipe now available in 5-ft. lengths. It is true to dimensions, smooth outside and inside, uniform in wall thickness and free from casting strains. The same standard flow table can be used as in figuring extra heavy steel pipe sizes.

The sizes now available are 2, 2½, 3, 4 and 6 inch.

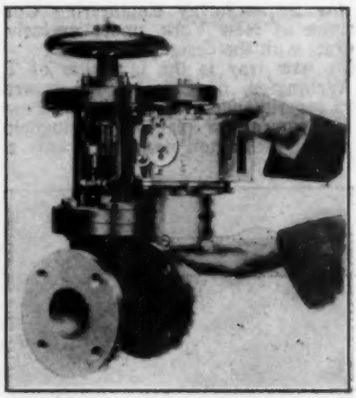
New Motor Driven Mechanism for Operating Valves

A new motor driven valve operating unit has just been announced by The CUTLER-HAMMER Mfg. Co., Milwaukee, Wis., which makes possible automatic operation of all valves up to 6 inches.

Although so small that it can be held in one hand, this unique operating unit has a rating of 15 lb. ft. It can be operated automatically by means of float switches, temperature controlling devices, pressure regulators, etc., or by conveniently located push buttons.

While designed primarily for valve operating service in industries where regulation of pressures and temperatures of gases and fluids is necessary, it is likewise adaptable to many miscellaneous applications, such as operation skylights, awnings, radiators, garage doors, etc.

Literature describing this new unit (called C-H type Ao Valve Operating Unit) will be sent free, upon request to The CUTLER-HAMMER Mfg. Co., 1298 St. Paul Avenue, Milwaukee, Wisconsin.

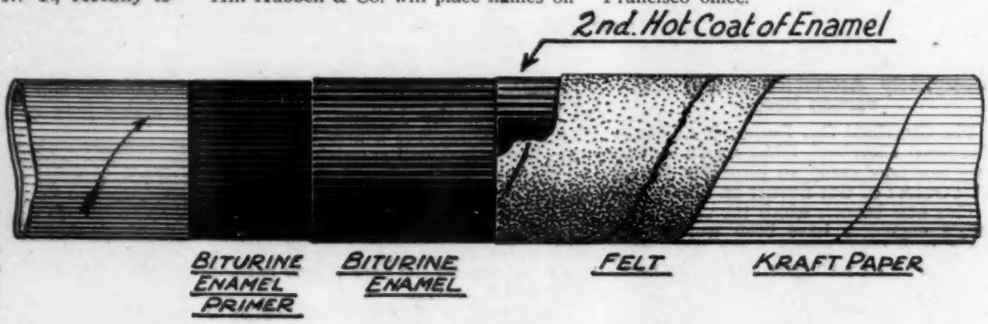


Protection of Pipe Lines

Hill-Hubbell & Co., San Francisco, Cal. and New York, N. Y., recently issued Number One of a series of Bulletins on the subject of the "Protection of Pipe Lines." The Bulletin describes some new and novel methods of application of protective covering and contains illustrations showing each process.

It also contains valuable suggestions for coating, either at the pipe manufacturing plant or by the gas company at its plant as required.

Hill-Hubbell & Co. will place names on their mailing list to receive all the Bulletins as issued on request to their San-Francisco office.



Book Review

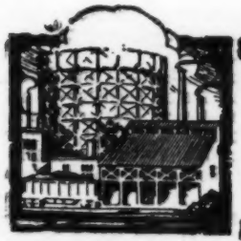
The Technology of Low Temperature Carbonization. By Frank M. Gentry. The Williams and Wilkins Company, Baltimore. 399 pages. Price, $7.50.

The author of this book set out to prepare a technical and economic review of the present status and the prospects of low temperature processing of coal. He very rightly says in his preface that "This is the first book in America dealing exclusively with the subject of low temperature carbonization." And if judged on the merit of the work the book is due to have a very cordial reception.

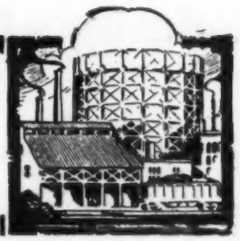
The author has made an excellent selection of really fundamental material of general applicability. In striking contrast with the make-up of most books on coal carbonization this volume does not give a tedious and comprehensive review of every process and patent with which the literature is already overburdened. Only about one-eighth of the volume is devoted to specific processes. The rest treats of more important and far more significant considerations, including the influence of technology and present product markets on the future trends of the industry. In the group of processes selected are several of the most important and most promising that have received attention in the United States. The list is also striking for some of its omissions of much-talked-of, but rather doubtful ventures. In this respect the author is again to be congratulated upon his fearlessness and, so far as the present reviewer can judge from a hasty perusal of the book, upon his excellent judgment.

Those interested in high temperature coking will also find much of real value for themselves in this work. It is a volume which can be strongly commended to all concerned with any technical or management phase of the coal-gas business.

Crystalite is the subject of an illustrated bulletin 183 issued by the International Filter Company, 333 W. 25th Place, Chicago. This attractive 16 page technical booklet discusses; the chemistry of zeolite water softening, the early history and development of zeolites, Crystalite the super rapid zeolite, the advantages of upflow softening illustrated with curves, the adaptability of Crystalite to upflow softening, International Crystalite water softener installations are shown, and important uses of Crystalite softened water are listed. Copy upon request.



NEWS OF THE GAS INDUSTRY



Seeks to Operate Distribution System in East Chicago

The Northern Indiana Public Service Company, in a petition filed with the Indiana public service commission, has asked authority to operate under lease from the Indiana Natural Gas and Oil Company, a gas distribution system in East Chicago, now under lease by the East Chicago Gas Company.

Both the Northern Indiana Public Service Company and the East Chicago Gas Company now serve customers in East Chicago. It is proposed to transfer to the former company the lease held by the latter. This transfer, the petition said, will place the entire gas distribution system in the city of East Chicago under the control and management of one company and will result in improved service and greater convenience to the consuming public.

The Northern Indiana Public Service Company and the East Chicago Gas Company both are subsidiaries of the Midland Utilities Company which controls a number of public utility companies located chiefly in northern Indiana.

Rate Schedule Approved

The Public Service Commission has approved a new schedule of the Binghamton, N. Y., Gas Works for gas service supplied in city of Binghamton and villages of Johnson City and Port Dickinson. Schedule effective November 20, 1928, provides block rate as follows for use of service for light and fuel:

For any part of the first 200 C. F. per month $1.10 and for excess consumption per month (rates per M. C. F.) next 2,000 C. F. $1; next 22,000 C. F. 90c; next 25,000 C. F. 85c; next 50,000 C. F. 80c; next 300,000 C. F. 75c; all over 400,000 C. F. 70c. If no gas is used no bills will be rendered. Discounts as follows allowed if bills are paid on or before tenth day following rendition. For all bills of 200 C. F. or less per month 10c per bill. For bills over 200 C. F. per month, 10c for first 200 C. F. per month and 10c per M. C. F. for all over 200 C. F. per month. Changes will operate to effect both increases and reductions.

Files Certificate Increasing Shares

Associated Gas and Electric Company, Ithaca, has filed a certificate in the office of the secretary of state increasing the number of shares of its non par value stock from 4,000,000 to 4,200,000 shares.

Houston Gas Company In Good Shape

A short review of the early history and growth of the Houston (Texas) Gulf Gas Company was outlined recently by M. A. Hardie in an article in appearing in the Houston Chronicle. In this article Mr. Hardie said:

"The company commenced pipe construction September 2, 1925, in Refugio County. It completed its trunk line into the city of Houston, on May 12, 1926, on which date the first natural gas was delivered into the city mains of the Houston Gas and Fuel Company for local distribution to domestic consumers.

"This supply of an ideally clean, economical fuel for all uses has been provided to Houston continuously since that date."

The Houston Gulf Gas Company was incorporated under the laws of Delaware on July 31, 1925, and was authorized to do business in the state of Texas on August 31, 1925.

The company stands prepared to furnish a supply of natural gas to the city and its industrial environs in volume several times greater than the amount now consumed, and to keep pace with the growth and expansion of Houston to its fullest extent.

The strong position of the company is the result of its progressive program of development, not only in the Refugio and White Point gas fields from which it now draws its chief supply of natural gas, but because its strong position throughout practically the whole gas-bearing province of South Texas.

In this province the company controls, through leases and gas purchase contracts, fully 200,000 acres of gas-bearing lands, the greater part of which is actually proven to an extent which assures the company of ample supplies of natural gas and prospective requirements for many years.

In the Refugio, White Point and Saxet gas fields it controls at least several hundred billion cubic feet of proven supply. Thus the company's very strong position in this respect enables it to plan its program of development of gas supply and reserves along lines of most economical and efficient administration and to look into the future expansion with full confidence as to its sound position.

Continues to Get More Gas Wells

During late October the Cities Service Gas Company, a subsidiary of the Cities Service Company brought in a gas well in Carson County, Texas which is making 14 million cubic feet of gas daily and makes the total number of gas wells in that section thirty and brings the total open flow of gas up to 743 million cubic feet a day.

Demand For Gas Heating Increasing

Figures given out by the Public Service Company of Colorado shows that many Denverites are forsaking the old coal furnace for the newly improved gas heaters. This winter finds 2,769 gas heaters in service in Denver and more will follow.

During the artificial gas days, December 31, 1927 with a consumption of 13,575,000 cubic feet was the largest one day consumption in the history of the company. On October 16 the largest consumption of natural gas thus far was 7,390,000 cubic feet, but it is pointed out that the present natural gas shows up at 1,040 b. t. u. and that should the artificial gas with considerable less heat units have been used on October 16 last the consumption would have been 19,000,000 cubic feet. Therefore, the greatly improved heating qualifications of the natural gas stand out, and with the charge per 1,000 cubic feet almost the same, it is plain that the saving and better heating are such as to win favor with the customer and the increasing demand for gas for heating purposes proves that the customers are taking advantage of it

Gas Plant Proposed for Crown Point

Preliminary plans were taken at the last meeting of the city council at Crown Point, Ind., for the construction of a gas plant there during the next few months. Fred W. Frees of Chicago, an engineer, appeared before the council requesting that the city permit and authorize him and his company to install the necessary gas mains. The plant was estimated to cost about $150,000. A preliminary survey of the city has been made. The council granted the necessary authority with the stipulation that the plant be in operation by Sept. 2, 1929. Rates will be in accordance with those fixed by the Indiana public service commission. It was stated that the company had an option on a tract of land in the north part of the city on which its plant will be located.

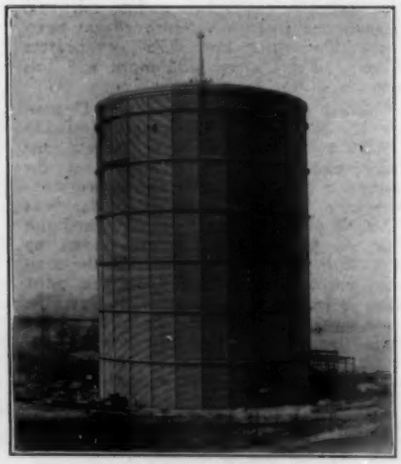
Grants Permission to Construct and Operate Distribution System

The Public Service Commission has granted the petition of the Westchester Lighting Company for approval of the right to construct and operate a gas distributing system in Bedford, Westchester County, under a franchise granted by the town board.

Industry's Largest Holder a Beacon To Aviators

A 20,000,000 cubic foot waterless holder —the largest in the history of the gas industry and the first to be marked and lighted from official aeronautics specifications for protection against aircraft and guidance of air traffic—has just been completed in Chicago.

The huge structure is 416 feet high, exclusive of a 70-foot tower, has an over-all diameter of 283 feet and sets beside a giant gas main, four feet in diameter, which reaches over 33 miles along the western and southern flanks of Chicago.



World's largest holder

The holder is located in the southwestern section of the city, two miles southeast of the Chicago Municipal Airport. The Peoples Gas Light and Coke Company co-operated directly with aviation authorities in the Department of Commerce at Washington and with local air transport interests in painting, lighting and otherwise marking the holder.

This is the first time that the builders of any industrial structure have called upon the federal aeronautics officials to design the collateral aviation-aid details. The obstacle lights and daytime markings have full government and local approval.

As a result of this co-ordination, the company's policy of making its holders as inconspicuous as possible has been entirely reversed. The new "gas tower" is painted a vivid sage green, a color that looms out through hazy atmosphere and does not blend with sky or land background.

The upper part, thirty feet down from the cornice, is painted in three horizontal bands of chrome yellow and black in equal widths. In chrome yellow, on the solid black face of the roof, is painted, "Chicago Municipal Airport 2 Miles," in 30-ft. letters, with an arrow, also chrome yellow, the entire diameter of the holder, indicating the direction. At night the arrow is brilliantly floodlighted.

A cluster of red lights, consisting of a single thousand-watt light encircled by 14 150-watt lights immediately below it, surmount the 70-foot tower. Around the cornice, at every other of 28 bays, is another 150-watt red light and, halfway down the side of the holder, still another one below each of the cornice lights.

All of these 53 lights are encased in special refracting and reflecting obstacle light globes with prisms which intensify the candlepower of the bare lamps progressively so that the light appears equally bright from any position and gives a strong, narrow beam directly upward.

The lights are turned on and off at dusk and dawn by an astronomical clock. In addition, a photo electric device, controlled by intensity of light in the surrounding atmosphere, turns the lights on and off during the daytime when unusual darkness occasions it.

Under ordinary atmospheric conditions the tower light is visible from five to ten miles away. Exceptionally clear nights increase the visibility-distance to about 15 miles.

Artistic Treatment

Because of the prominence of the holder in the community due to the aviation markings—and due, too, in no small way to its immense size—it has been treated architecturally for sightliness. The 70-foot tower was added to enhance the silhouette and there are ornamental spiked railings around the top of the roof ventilator and another row protruding upward from the cornice. A raised ornamental frieze runs around the circumference of the holder just below the cornice. The grounds about the holder are to be graded and appropriately landscaped.

The new holder brings the total storage capacity of the Peoples company to 108,000,000 cubic feet, which is practically an average day's sendout and only a little less than 75 per cent of the present maximum 24-hour demand.

In addition to the holder, the site has a compressor house with a 24-hour potential distribution capacity of 36,000,00 cubic feet, provided by two 500 horsepower units, each with an hourly capacity of 750,000 cubic feet. The company's 15,000,000 cubic foot waterless holder in the northwest section of the cty—also tied in with the 33-mile four-foot main—is served with a pumping station of equal size.

The size of the company's previous holders was based on minimum existing necessity. On that basis, the present new holder would have been merely a duplication of the company's 15,000,000 cubic foot holder completed two years ago. But in planning this new one, great emphasis was placed on the possibility of reducing investment cost per thousand cubic feet of holder capacity as send-out and, consequently, storage capacity, increased in the future.

Although the initial cost is relatively greater, a 20,000,000 cubic foot holder costs no more than a 15,000,000 cubic foot one as far as operating cost and regular maintenance expenses are concerned. A minimum operating shift of two men—an engineer and an assistant—is all that is required for the new holder and pumping station. The regular maintenance "crew" consists of only two men—one to oil and care for the mechanical equipment and another to keep the grounds and compressor house in order.

The size of the holder was not based entirely on this one factor, however—it affords facility for storing greater quantities of purchased by-product gas, obtainable from the steel mills in the district just southeast of the holder, among other advantages.

A 24-inch main recently was laid from a South Chicago steel mill which brings in 11,000,000 cubic feet of purchased gas daily. It is expected that this amount can be increased to 20,000,000 cubic feet within a half-year.

At that time, the 11,000,000 cubic foot addition of by-product gas from this single source represented an increase of over 25 per cent in the company's total purchased gas, raising the amount to an average of 51,000,000 cubic feet daily. This volume will be increased in the near future to approximately 70,000,000 cubic feet or almost 50 per cent of the present combined outputs of the eight Peoples Gas production stations. The new holder is an important and significant addition to the facilities for insuring an adequate supply of gas in Chicago and adjacent territory. In this respect it is another step in the continued development of a recently inaugurated "super-gas" service in the Chicago district.

To direct aviators

The Peoples company system is interconnected with the main-and-holder system of the Public Service Company of Northern Illinois—Chicago's neighboring utility on the north and west which supplies gas to Evanston, Oak Park, Cicero, Blue Island, Chicago Heights, Harvey and many other intervening suburbs adjacent to Chicago—and with that of the Northern Indiana Public Service Company which supplies the industrial district just over the state line—Hammond, East Chicago, Whiting, Indiana Harbor, and other manufacturing communities.

The Public Service Company of Northern Illinois has in this territory holder capacity of 17,000,000 cubic feet and the Northern Indiana Public Service Company has holder capacity of 14,000,000 cubic feet, which are, for all practicable purposes, adjuncts of the interconnected system.

For the statistically-minded, here are some facts about the holder which, for the ever-fleeting present, is the world's largest:

Speeding up the Winter Selling Program with Welsbach

RADIANT HEATERS. The growing number of Commercial Managers now choosing Welsbach as the basis for active selling campaigns is worthy of special notice.

A line of radiant heaters whose radiance is further enhanced by the value of the name Welsbach. They constitute a line of popularly designed models of modest price with real beauty of form and finish. Originality of design is one of the strongest factors in making a sale. And then, too, there's the name Welsbach—always of value to seller and buyer.

WATER HEATERS. Construction and favorable price combined come first. With the Welsbach experience behind design and production a Company knows it can rely on the product absolutely. And the lustre of the best-known name in gas appliance manufacture is a selling point of definite sales-closing value to the man who must get the signature on the dotted line.

Member of American Gas Association

WELSBACH COMPANY

GLOUCESTER CITY, N.J.

Offices in Principal Cities

It is a 28-sided polygon with an over-all diameter of 283 feet and an over-all height, including the tower, of 490 feet. It is 382 feet high to the eaves; 405 feet high to the top of the roof; 417 feet high to the top of the roof ventilator; and 490 feet high to the top of the beacon tower.

Five thousand five hundred tons of steel and 1,863,000 rivets, ranging in size from three-eighths to seven-eighths inch were used in its construction. One hundred thousand gallons of tar were used for sealing. The height is made up of 141 courses of steel plates.

There are six galleries about 60 feet apart all around the holder. Seven electrically-operated pumps are spaced around the holder to pump the sealing tar. It is equipped with inside and outside elevators, electrically-operated. The red obstacle lights and floodlighting of the roof have a total wattage of 8,500.

The length of time in which the holder and accoutrements were constructed by The Bartlett Hayward Company, of Baltimore, Maryland, is another factor which distinguishes the project. It was a world's record for speed on any comparable type of steel construction.

Ground was broken on March 29, 1928. The first piling was driven April 9. On June 11 the first steel was laid and the bottom was lowered June 23—12 days. Erection of the piston trusses was started on July 2 and completed July 9—seven days. The roof trusses were erected from July 14 to July 22—eight days. On August 11 the first part of the shell was started and the top was reached September 17—37 days. The holder was purged November 15—157 days after steel was first laid!

As this is written, plans are being formulated for a ceremony to take place when the holder is formally placed into service on December 19th.

Stone & Webster New England Utilities Hold First Aid Contest

The second annual First Aid Contest between New England public utilities under the Executive Management of Stone & Webster, Inc., held at Rockland, Massachusetts, October, 24, was won by the team of the Edison Electric Illuminating Company of Brockton, Massachusetts, which scored 98.67% in the three problems assigned to the competing teams.

The other companies participating in the contest and their scores were: The Electric Light and Power Company of Abington and Rockland (Mass.), 98.33%; Pawtucket (Rhode Island) Division of the Blackstone Valley Gas & Electric Company, 89%; Fall River Gas Works Company, Fall River, Mass., 97.5%; Woonsocket (Rhode Island) Division of the Blackstone Valley Gas & Electric Company. 97.33%; Lowell Gas Light Company, Lowell Massachusetts, 96.67%; Haverhill Gas Light Company, Haverhill, Massachusetts, 95%.

The competition was conducted according to the contest rules of the United States Bureau of Mines. Safety Supervisors of the New England Telephone & Telegraph Company officiated as judges.

Stone and Webster, Inc., are sponsoring this annual event to stimulate interest in first aid work among the employees in companies under their Executive Management and among the people in the communities these companies serve.

In at least three cases during the past year employees of New England companies under the Executive Management of Stone & Webster, Inc., have been able to save lives as a direct result of their proficiency in first aid methods. In many other cases they have had opportunity to relieve suffering and hasten the recovery of victims of near-drowning accidents, carbon monoxide poisoning, electric shock, and automobile accidents.

Members of teams Participating in 2nd Annual First Aid Contest Between New England Companies under Executive Management of Stone & Webster, Inc., held recently at Rockland, Massachusetts.

Public Utilities Must Use Individual Notices

The Colorado public utilities commission have instructed all public utilities whether private or municipally owned that they must notify each customer of any changes which will affect them. Heretofore it was only necessary to advise the commission.

Incidentally, the Public Service Company of Colorado has always sent out individual notices.

Milham Gas Gusher

The outstanding development in the natural gas situation in California during the recent past was the blowing in of the Milham Exploration Company's Gas Well in the Kettleman Hills south of Coalinga. This is a hole approximately 7,100 feet deep, which was blowing about 20,000,000 cubic feet of gas daily. Seven or eight large oil companies are interested in this territory and the development of this gas well is expected to be the forerunner of considerable activity here. With a roar that was heard 15 miles this well broke loose spouting twenty million feet of wet gas daily.

Milham gas well blowing 20,000,000 cu. ft. of gas daily

Gas Company Marketing Its Coke

Now that the Public Service Company does not have any coke to market, the Greeley Gas Company, fifty-two miles east of Denver, is marketing its coke in Denver through the Colorado Fuel and Iron Company. The October retail price, furnace size, was $9.75 a ton. The coke is described as bone dry and will not break down in storage.

Natural Gas Transmission On A Scientific Basis

Clare N. Stannard, vice-president and general manager of the Public Service Company of Colorado, accompanied by some of his engineers recently returned from an inspection of the Denver-Amarillo natural gas pipe line. Fully aware that the cold weather will necessitate an increased pressure, Mr. Stannard said:

"Everything is in excellent condition, the gas supply enormous, but we watch the government predictions like a hawk, and twelve hours before the cold weather has struck Denver we have started an extra large supply of gas on its way. Ordinarily 20 million cubic feet of gas is sent into Denver daily, yet we can send in 100,000,000 cu. ft. within a few hours.

GLOVER-WEST
Vertical Retorts

Faribault, Minn.

The Faribault Gasworks of the Byllesby Engineering & Management Corporation showing the Installation of Glover-West Vertical Retorts

WEST GAS IMPROVEMENT CO.

Builders of Coal Gas Plants

441 Lexington Ave. New York

Work Started on Holder

The Central Illinois Public Service Company, Quincey, Ill., started work upon Nov. 1, on a 300,000 cubic foot gas holder at Eighth and Jersey streets and the work will be completed as rapidly as possible. The company announced that three new ovens are to be constructed immediately to meet increasing demand for gas in this community. The company is also planning extension of its six and eight-inch mains in the city and this work will be undertaken as soon as city approves the work.

Approve Franchises for Extending Distribution System

The Public Service Commission has approved franchises by North Syracuse and the town of Clay, under which the Svracuse, N. Y., Lighting Company will extend its gas distribution system from Syracuse through Saline to North Syracuse where there are about 400 residents who want service and to Clay. The franchise approval by the Commission followed hearing on the company's petition by Commissioner Brewster.

Considering Natural Gas for Vincennes

Engineers are completing a survey on the feasibility of supplying Vincennes, Ind., with natural gas. It is understood that a report embodying the findings of the engineers will be sent to the general offices of the company soon and will receive immediate attention of officials of the company.

A gas well producing 6,000,000 cubic feet a day recently was brought in at Francisco, Ind., a short distance from Vincennes. The survey is said to cover the feasibility of marketing gas from this well and other gas producers of the Oakland City field to Vincennes. The plan would call for a pipe line about 25 miles long to the corporation line at Vincennes, where it would be distributed by the Central States Company. The present equipment for manufacturing artificial gas would serve as auxiliary in case of a break in the natural supply.

A portion of New York Consolidated's new show room

Personals

Howard A. Lockhart, formerly Chief Chemist of the Fall River Gas Works Company, Fall River, Mass., has taken a position with the Lowell Gas Light Company of Lowell, Mass., as Industrial Service Engineer. Both the Lowell and Fall River companies are under the Executive Management of Stone & Webster, Inc.

Mr. Lockhart is a graduate of the Massachusetts Institute of Technology in the class of 1923. After about a year in the Statistics Department of Stone & Webster, Inc., he joined the Fall River Gas Works Company as Student Engineer. He later was promoted to Assistant Chemist and in January 1928 to Chief Chemist. Mr. Lockhart took over his new duties November 13, 1928.

Harry L. Swicegood, Supervisor of the Sales Floor of the Fall River Gas Works Company, Fall River, Mass., was transferred November 13, 1928 to the Electric Light & Power Company of Abington and Rockland (Mass.) where he became Assistant to Mr. Robbins, Engineer. He will be located at North Abington.

Mr. Swicegood is a graduate of the Georgia School of Technology in the class of 1926. Before joining the Fall River company in November, 1927, he was a member of the Statistics Department of Stone & Webster, Inc. Both the Fall River Gas Works Company and The Electric Light and Power Company of Abington and Rockland are under the Executive Management of Stone & Webster, Inc.

Obituary

On Sunday afternoon, November 18, 1928, John G. Way, for twenty years Manager of New Process Stove Company, died at his home in Cleveland. His death was due to heart failure.

Mr. Way's beginning with the New Process Stove Company dates from the year 1893 when that company was known as The Standard Lighting Company.

In addition to being Manager of the New Process Stove Company Division Mr. Way was also a Director of American Stove Company and a member of the Executive Committee.

Mr. Way is survived by his wife, Berva Potts Way, a daughter Ethel E., and by two brothers, Frank and Robert. Interment was at Lakeview Cemetery, Cleveland, Ohio, Wednesday, November 21, 1928, following services at the home.

Trade News and Construction

Electrolux Agents & Dealers Appointed

Newport News Furniture Co. Inc., Newport News, Va. will handle the Electrolux gas refrigerator.

This company has been in the furniture business for almost a quarter of a century and is well known and favorably regarded in the territory adjacent to Newport News.

Distributor franchises for both types of refrigerators have been granted to the Midland Implement Company, Billings, Montana and the Pikesville Refrigeration Co., Pikesville, Ky. The following have been appointed dealer for Servel and Electrolux; The M. O'Neill Company, Akron, Ohio, and H. T. Arnold, North Chatham, N. Y., and the following Electrolux dealers: Baldwin Radio Shop. 129 N. Vermillion St., Danville, Ill.; H. L. Wolf Plumbing & Heating Co., McPherson, Kan.; Emmert Brothers, Zanesville, Ohio; and the Bridgeton Gas Light Co., Bridgeton, N.

across— WESTERN PLAINS with 10" MONO-CAST!

"CAN large diameter Mono-Cast cast iron pipe be laid successfully and economically?" This striking installation photograph proves that it can . . . and *is* being laid even under adverse conditions.

The Mono-Cast installation shown here is part of a line laid across hot Western plains. Engineers who laid this line wrote us: "You will be particularly interested in the picture of the pipe bending over the rise in the ground. Mono-Cast took this rise without the use of fittings!"

No matter where the line: through sizzling sands, dismal swamps, flinty coral reefs—Mono-Cast costs less to lay because it has one-fourth less joints. That means one-fourth less packing, pouring, and caulking . . . a greater footage laid each day.

More than 5,500,000 feet of Mono-Cast pipe are now in service. Communicate with our District Offices.

OFFICES

Chicago
Kansas City
Dallas
Los Angeles
San Francisco
Seattle
Minneapolis
New York City

AMERICAN CAST IRON PIPE COMPANY

BIRMINGHAM, ALABAMA

DISTRICT OFFICES IN PRINCIPAL CITIES

J. Mr. Foulds also stated that C. Carisch & Son, River Falls, Wis., have become dealer for Servel.

Stacey Construction Co. Push Holder Construction

Rapid progress is being made by the Stacey Construction Company on the large new gas holder of the Central Indiana Gas Company, Anderson. Ind. The foundation and part of the steel structure of the holder has been completed.

Distributor for Botfield Products

Botfield Refractories Co., Philadelphia, Pa., manufacturers of ADAMANT Fire Brick Cement; ADAMANT-ADACHROME Super -Refractory Mixtures and The ADAMANT Gun, announces that The Marshall Supply Company, Incorporated—operating in Pittsburg, Kansas and Tulsa, Oklahoma—have been appointed distributor of all their products.

Lest we forget

International Combustion to Build Coal Carbonization Plant at Lukens Steel Company, Coatesville

George E. Learnard, President, International Combustion Engineering Corporation announces that contract has been closed with the Lukens Steel Company, Coatesville, Pa., which provides for the building of a Low temperature Coal Carbonization Plant at Coatesville.

This will be the first Low Temperature Coal Carbonization Plant identified with the Steel Industry and the second installation in America. The initial American installation near New Brunswick, N. J., is nearing completion and will be placed in operation in the near future.

Ground will be broken for the Coatesville installation the first of the year and the plant is expected to be in operation early in 1930.

The new plant will be owned and operated by the International Coal Carbonization Company (A subsidiary of International Combustion Engineering Corporation) which will sell the gas to the Lukens Steel Company under a long term contract.

Approximately 1,750,000 cubic feet of gas will be produced daily. This is a high quality gas which will be used for the heat treating of steel throughout the Lukens Plant and will replace raw producer gas now used for this purpose.

In addition to the gas derived from the new process other valuable constituents of the coal are recovered, consisting of a high quality tar, light oils, a superior grade of anti-knock motor fuel and a high grade domestic fuel.

This fuel, which will be sold locally, is of excellent quality for domestic purposes, of firm structure, easily ignited and absolutely smokeless.

The initial installation will comprise six retorts and will be capable of carbonizing 500 tons of high volatile bituminous coal per day. The daily coke yeild available for domestic use will average from 300 to 325 tons.

The ultimate plant is designed for double this capacity.

W. Frank Roberts Elected Chairman of The Board and President of Standard Gas Equipment Corporation

Immediately upon his election, Mr. Roberts assumed charge of the affairs of the Company following the resignation of Mr. R. Curzon Hoffman, Jr., former President.

Mr. Roberts was for ten years general manager of the Baltimore operations of the Bethlehem Steel Corporation, resigning that position to assume charge of his new office.

During the ten years of his direction of the affairs of the Baltimore operations of the Bethlehem Steel Corporation, Mr. Roberts carried out an extensive building program which the Bethlehem Steel Corporation had mapped out for the Baltimore district.

W. F. Roberts

During that period approximately $75,000,000 was expended on the big plant at Sparrows Point. Today, it ranks with the most modern steel-making industries in the country and is said to be the lowest cost plant owned by a corporation.

When Mr. Roberts came to Baltimore only one article was manufactured at Sparrows Point—steel rails—the output of which, even in the busiest of seasons, did not exceed 35,000 tons monthly. Now, practically every form of steel is turned out from nails to the largest size tubes. Their production in the various departments approximates 150,000 tons monthly.

Mr. Roberts is regarded as an authority on the manufacture of steel and has won special honors and distinction for the masterful manner in which he supervised the remodeling and enlargement of the Sparrows Point Plant.

Standard Gas Equipment Corporation is fortunate to have as its active executive officer a man of Mr. Roberts wide business and managerial experience.

United Engineers & Constructors, Inc. Activities

The Chester Pa. Coke Oven Plant, of the Philadelphia Suburban-Counties Gas and Electric Company will shortly put in operation a Cottrell Electric Tar Precipitator which will have a daily capacity of 6,000,000 cu. ft., with equipment for an ultimate daily capacity of 12,000,000 cu. ft. The contract for this work has been placed with The U. G. I. Contracting Company, a division of United Engineers & Constructors, Inc. It carries with it also the furnishing and installing of welded steel connections.

A contract of unusual interest has just been awarded by the New Bedford, Mass. Gas & Edison Light Company. Included in the work to be done will be the installation of a 11 ft. U. G. I. Carburetted Water Gas Set equipped with U. G. I. Mechanical Generator, with automatic fuel charger and Chrisman Cycle. In addition to the apparatus, there will be a U. G. I. Vertical Waste Heat Boiler.

The contract also includes the installation of an Electric Motor Driven Blower Plant, Blast Main System and Fuel Handling Equipment with Vibrating Screen, Fuel Weigher, Building Conveyor and Storage Hopper.

With experience derived from the operation of former U. G. I. High Duty Condensers. The Philadelphia Gas Works Company have ordered an additional large condenser of the 8-pass type.

The Brunswick, Ga. gas plant of the Mutual Light & Water Company was in need of additional manufacturing equipment to be ready for operation on December 1st. Thru the Empire Construction Company, of Atlanta, Ga., they awarded the contract on October 29th, with the understanding that the equipment desired was to be ready for operation as above stated.

The Contracting Company immediately

THIS MODERN TREND CONTINUES TO GROW

PROVES ITS ECONOMY

The last few months have witnessed a decided preference for Seamless steel line pipe on the part of experienced pipe line operators. The higher pressure capacities of seamless steel have revolutionized pipe line transportation in the sections where its use has become general.

Split welds and leakages no longer present their worrysome problems.

Pittsburgh Seamless has made possible great laying and operating economies by reason of its longer lengths (up to 45 feet) and its adaptability to the special analysis steels. It is paying its way as it goes.

Pittsburgh Seamless is the modern standard for all important piping. It is made of stronger, more durable steel and eliminates the weakness of welded pipe seams

Pittsburgh Seamless ***Is Safe***

Pittsburgh Steel Products Co.

DIVISION OF

Pittsburgh Steel Co.

DETROIT · CHICAGO · NEW YORK · PITTSBURGH · HOUSTON · TULSA

got into action and had all of its material on the gas plant site by Nov. 15th, and its erection crew arrived at the same time. With all parts of the work co-ordinating, the erection progressed without any delays and the completed plant was turned over to the local company, ready for operation on the date specified.

The contract included the installation of a 6 ft. U. G. I. Carburetted Water Gas Apparatus, with Chrisman Cycle, together with electric driven blower unit and blast main, also an electric driven fuel hoist.

In addition to this equipment, there was also installed a U. G. I. high duty condenser and immersion washer, together with by-passes and gas connections.

With the addition of this apparatus, the Brunswick plant capacity will be increased by more than 800,000 cu. ft. of gas per day.

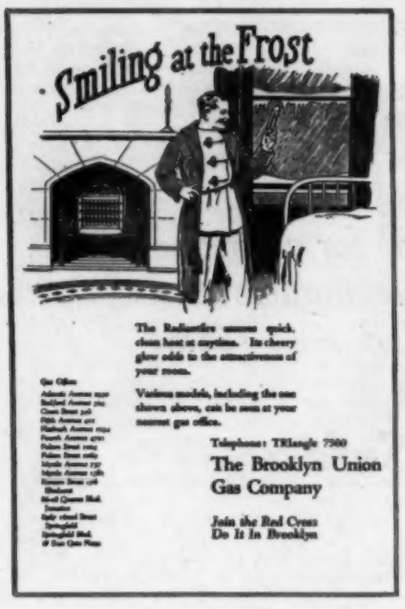
C. E. George Joins Sales Staff of Taylor Instrument Company

Mr. C. E. George, for many years Western manager of the American Schaeffer & Budenberg Corp., has recently joined the sales staff of the Taylor Instrument Companies of Rochester, N. Y.

He will be associated with the Chicago office of the company with headquarters at 58 East Washington Street, Chicago, Ill.

Grants Authority to Carry on Business in Cohasset

The State Department of Public Utilities has granted the Old Colony Gas Company authority to carry on its business in Cohasset, Massachusetts. The Company already serves Braintree, Weymouth, Hingham, Rockland, Abington and Whitman, Massachusetts.


Smiling at the Frost
The Radiantfire answers quick, clean heat at anytime. Its cheery glow adds to the attractiveness of your room.
Various models, including the one shown above, can be seen at your nearest gas office.
Telephone: TRIangle 7500
The Brooklyn Union Gas Company
Join the Red Cross Do It In Brooklyn

Sell 'em heating comfort

Consoldated Gas Company of New York's exhibit at the National Hotel Exposition, November, 1928

Garbage Man or Furnace Man?
BANG!
IT might be either or both. What does it matter, when he wakes you up before cock crow?
Untimely noise is only one of the things you get rid of when you heat your home with gas. Why not ask your Gas Company today about its new rates for house-heating customers?
NEW YORK & QUEENS GAS COMPANY
Gas and Electric Building
Flushing, N. Y.
Tel. FLUshing 5200

Even So

Arthur W. Thompson Granted Leave of Absence

The United Gas Improvement Company recently held a special meeting of the Board of Directors, after which the following statement was issued:

"Due to overwork in the service of the Company, our President, Mr. Arthur W. Thompson, has been in impaired health for some months past. Though much better now, his present condition is not such as to make it advisable for him to continue under the same strain of work in the immediate future. Accordingly, the Board has given Mr. Thompson a six months' leave of absence in the hope that at the end of that period he will be fully restored to health.

"The Board has further authorized the appointment of Mr. John E. Zimmermann as Chairman of the Executive Committee, with temporary full executive powers conferred upon him. Mr. Zibmmermann has agreed to accept such a temporary assignment of duty, upon condition that he is not committing himself, nor is the Company committing itself by reason of such appointment, to any permanent use of his services as an executive officer, he being unwilling to assume any such obligation."

Stevenson Appointed Asst. to President of Consolidation Coal Co.

Effective November 26th, 1928, the Consolidation Coal Company announces the appointment of Mr. Walker W. Stevenson as Assistant to the President, with offices at 15 Broad Street, New York City.

Mr. Stevenson is well and favorably known to the industrial coal buyers of this country through his extensive work as Consulting Combustion Engineer and from his long association in various executive capacities with the Semet-Solvay Company of 61 Broadway, New York City.

As Superintendent of both the Ashland By-Product Coke Company of Ashland, Kentucky, and the Ironton By-Product Coke Company, of Ironton, Ohio, Mr. Stevenson was in a large measure responsible for the successful introduction of Semet-Solvay coke as a household and industrial fuel through the sales areas of the Central Western States.

Prior to that time Mr. Stevenson had been connected with the company in a technical capacity in Detroit, and in 1923 he returned to the Detroit Office as Superintendent for the company of that district.

The following year he came to the General Offices in New York as General Superintendent of the Semet-Solvay organization, which connection he maintained until he took up his work in the consulting engineering field.

The more intimate history shows that Mr. Stevenson was born in New York City; prepared for college at Lawrenceville; graduated from Princeton University in 1905. He is fond of outdoor sports; played college baseball; hunts, fishes and plays golf; past president of Ashland Rotary Club; member, American Gas Association and Princeton Engineers Association.

An Act

of the Select *and* Common Councils

127 years ago

that saved money for Philadelphia taxpayers in 1928

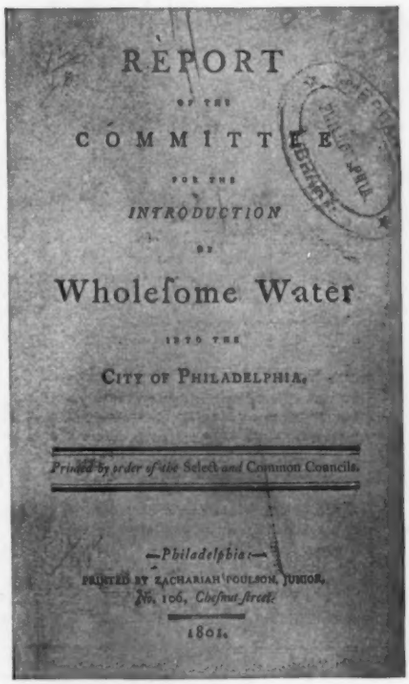
A lesson in public economy of interest to property owners everywhere!

In the year 1801 the City Fathers of Philadelphia passed an act authorizing experiments which would determine the best possible pipe for the city's new water system. Testing was continued for fifteeen years. Cast Iron Pipe was officially adopted.

Today, beneath the roaring traffic of a great city, Cast Iron Pipe laid more than 100 years ago is still in service. The predictions of the forefathers have been fulfilled. Cast Iron Pipe has saved Philadelphia taxpayers millions which would have been required had shorter-lived material been used. And Cast Iron Pipe has saved millions for the taxpayers of other cities, large and small, from Coast to Coast.

For Cast Iron Pipe's full span of life has never been measured. Mains that have been in service for 250 years are still in use. Once laid, Cast Iron Pipe may be forgotten.

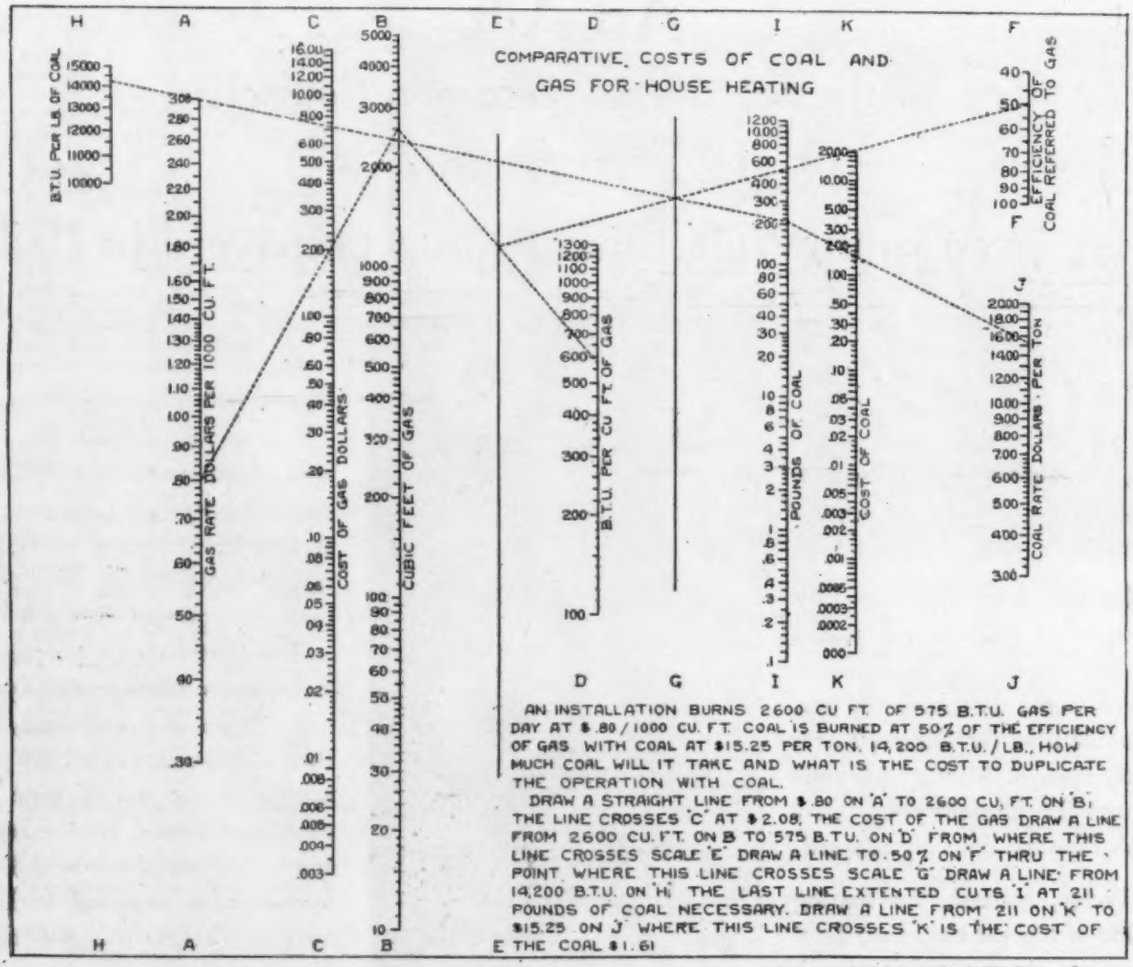
The Cast Iron Pipe Research Association offers to taxpayers, city officials and engineers, authentic data on every subject pertaining to the use of pipe for water, gas, sewers, road culverts and for industrial needs. All information is supplied without cost or obligation. Address: Thomas F. Wolfe, Engineer, Peoples Gas Building, Chicago, Illinois.


REPORT
OF THE
COMMITTEE
FOR THE
INTRODUCTION
OF
Wholesome Water
INTO THE
CITY OF PHILADELPHIA.
Printed by order of the Select and Common Councils.
Philadelphia:
PRINTED BY ZACHARIAH POULSON, JUNIOR,
No. 106, Chestnut-street.
1801.

"In the opinion of some gentlemen, iron has been thought to be the best material for pipes; and in order to procure a fair experiment, the committee have obtained a few feet which are now at Centre-square, and appear to be well-cast."

The Cast Iron Pipe Research Association is a service organization of leading pipe founders, formed to promote the scientific improvement and proper use of Cast Iron Pipe. Its members are: American Cast Iron Pipe Co., Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Ave., Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe & Foundry Co., Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Cast Iron Pipe & Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Company, 11 Broadway, New York City.

CAST IRON PIPE


COMPARATIVE COSTS OF COAL AND GAS FOR HOUSE HEATING
H
A
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BTU PER LB OF COAL
GAS RATE DOLLARS PER 1000 CU. FT.
COST OF GAS DOLLARS
CUBIC FEET OF GAS
B.T.U. PER CU FT OF GAS
POUNDS OF COAL
COST OF COAL
EFFICIENCY OF COAL REFERRED TO GAS
COAL RATE DOLLARS PER TON
AN INSTALLATION BURNS 2600 CU FT OF 575 B.T.U. GAS PER DAY AT $.80 / 1000 CU. FT. COAL IS BURNED AT 50% OF THE EFFICIENCY OF GAS WITH COAL AT $15.25 PER TON. 14,200 B.T.U. / LB., HOW MUCH COAL WILL IT TAKE AND WHAT IS THE COST TO DUPLICATE THE OPERATION WITH COAL.
DRAW A STRAIGHT LINE FROM $.80 ON 'A' TO 2600 CU. FT. ON 'B' THE LINE CROSSES 'C' AT $2.08, THE COST OF THE GAS DRAW A LINE FROM 2600 CU. FT. ON B TO 575 B.T.U. ON 'D' FROM WHERE THIS LINE CROSSES SCALE 'E' DRAW A LINE TO 50% ON 'F' THRU THE POINT WHERE THIS LINE CROSSES SCALE 'G' DRAW A LINE FROM 14,200 B.T.U. ON 'H' THE LAST LINE EXTENTED CUTS 'I' AT 211 POUNDS OF COAL NECESSARY. DRAW A LINE FROM 211 ON 'K' TO $15.25 ON 'J' WHERE THIS LINE CROSSES 'K' IS THE COST OF THE COAL $1.61

Courtesy Pittsburgh Equitable Meter Co.

Handy chart for calculating comparative costs of coal and gas for house heating.

SWELLING OF COAL DURING COKING

It is common knowledge that the semibituminous coals give trouble from sticking of the coke in the retort or oven after carbonizing. This is probably because the cokes do not shrink appreciably during the latter stages of carbonization as do those from coals higher in volatile matter. Abnormal swelling during coke formation would cause sticking, but this is not observed with semibituminous coals when coked at normal rates. Experiments at the United States Bureau of Mines, Pittsburgh Experiment Station have shown, however, that even semibituminous coals can be made to swell when coked at extremely rapid rates as in the crucible coking test. If the temperature is raised to 900° C. in one minute a strongly swollen button will result, whereas with the higher volatile coals swelling is not so pronounced. Results of the crucible test, it should be pointed out, should not be taken as indicative of the ease with which coke made from it can be pushed out of the oven since, although they do show abnormal swelling with coals which stick in the retort, the sticking is due rather to failure to shrink than to swelling during coke formation. Swelling with semibituminous coals is not observed with normal coking rates.

THE SULPHUR PROBLEM IN BURNING COAL

The clinkering of the ash in a furnace does not always vary directly with the sulphur content of the coal, United States Bureau of Mines, Department of Commerce. In common states J. F. Barkley, in Technical practice the sulphur content has been used as an index of clinkering tendencies, and for many coals it will serve fairly well for this purpose. The fusability of coal ash depends upon such factors as the ratio of the silica to the bases, the nature of the bases, the percentage of aluminum, etc. When the ratio of the silica to the bases is very high or very low the ash-fusion temperature is high. When sulphur occurs in the coal as a component of iron pyrites it indexes to a great extent the amount of the effective base, iron. When no iron is present there generally exists a highly siliceous ash of high-fusion temperature. When much iron is present the silica-base ratio is apt to be such that an ash of low-fusion temperature occurs.

Knowledge and Steam Always "Hook 'er to the Biler"

When Mr. Man knows the wonderful excellence of Ridgway Elevators and has steam or compressed air

He Changes His Troublesome Elevators to the Ridgway System.

And lives happily ever after
And prospers
And pays good dividends
And stops profanity out in the works
And hurrahs for "Old Hook'er."

THE STANDARD OIL, for example, which has changed many old elevators to Ridgway and bought lots of new installations.

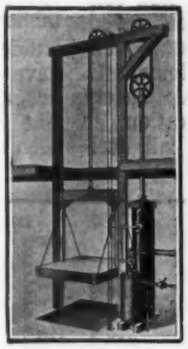
Why?

Because no one can name a single desirable feature in a freight elevator that is not to be found in a Ridgway Elevator.

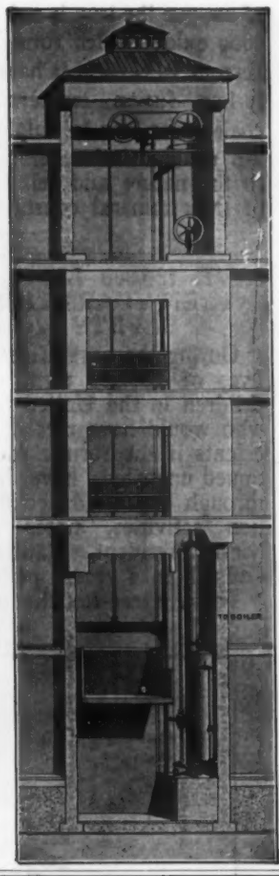
A list of the users of Ridgway Elevators is a roster of the country's greatest plants. These are the sort that

"Hook 'er to the Biler"

Direct Acting



Double Geared



Craig Ridgway & Son Co.

Coatesville, Pa.

Elevator Makers to Folks Who Know **Over 3000 in daily use**

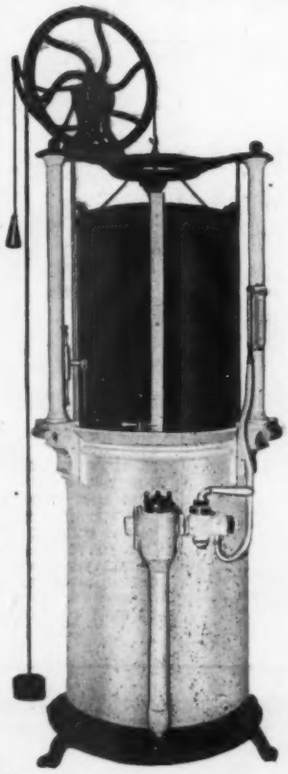
SUPERIOR

Gas Meters

Provers

Service Cleaners

Diaphragms



SUPERIOR METER CO.
167-41st Street
Brooklyn, N. Y.

At times in fuel beds because of lack of oxygen the iron is oxidized to ferrous oxide, which forms with silica ferrous silicates that have a relatively low fusion temperature. Some coals quite low in sulphur have an ash of low fusion temperature due to the nature and relative amounts of their mineral constituents. Sulphur in the organic compounds undoubtedly has little or no effect on the clinkering.

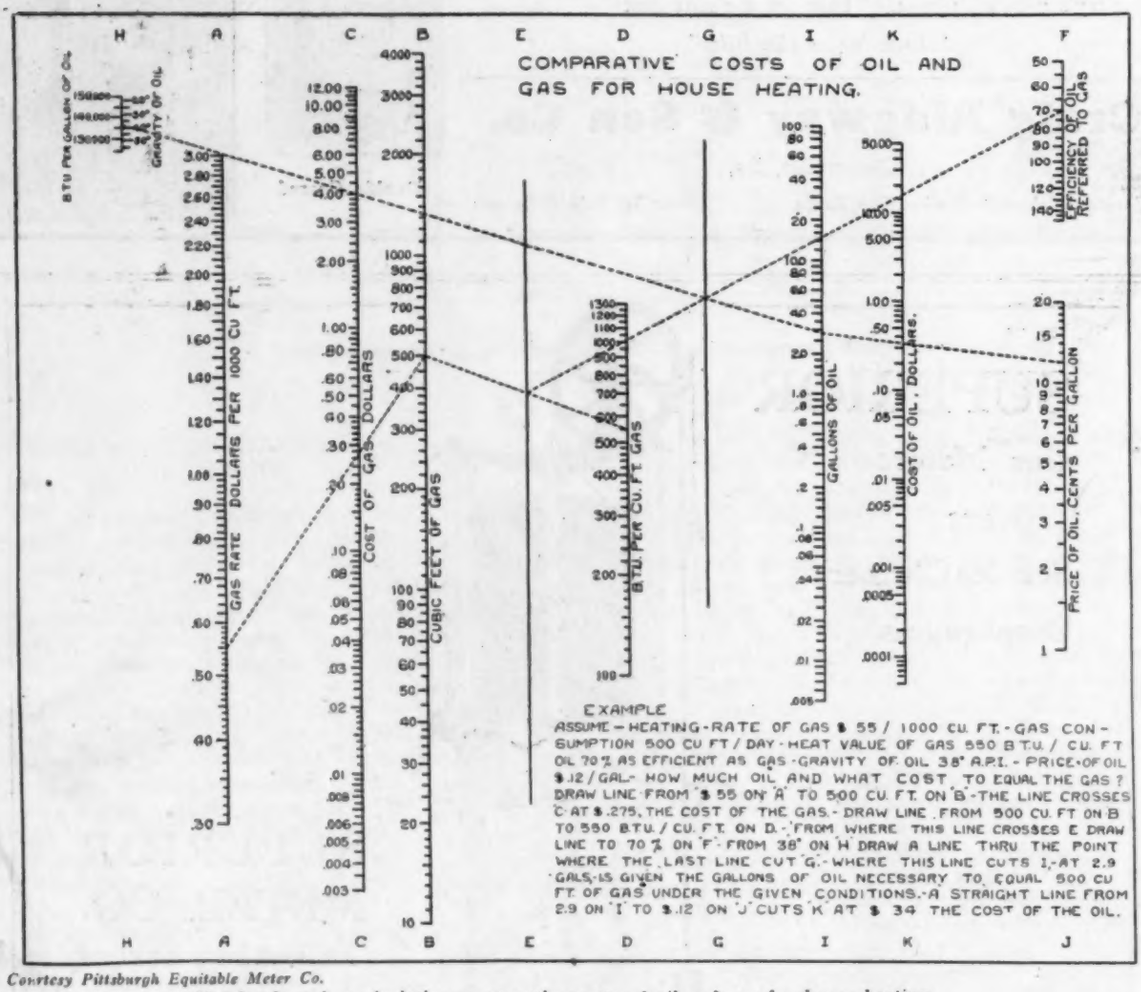
A discussion of the sulphur problem in burning coal is given in Bureau of Mines Technical Paper 436, which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a price of 5 cents.

SAVE 136,000 LIVES IN FIFTEEN YEARS THROUGH SAFETY WORK

During the past fifteen years, the lives of 136,000 men, women and children in the United States alone who would have met deaths in accidents if the former rate had continued unabated, have been saved, through organized accident prevention activities, states Homer E. Niesz, President, National Safety Council, in a recent publication.

Today three-fourths of all accidents occur outside of industry, stated the spokesman of the organized safety crusaders, who declared that automobile crashes can be prevented and have been prevented by exactly the same kind of organized efforts that have brought about safety in thousands of industrial establishments throughout the world. Numerous cities of varying sizes have reduced motor vehicle fatalities, as a result of organized efforts. The increase in auto crashes has been due, of course, to the rapid growth of the motor vehicle industry.

Last year the increase in automobile deaths was ten per cent, while the increase in registration of motor vehicles was only five per cent. There were not only more automobile deaths per 100,000 of population but there were more auto deaths per 1,000 of registered vehicles, continued Mr. Niesz, who pointed out that despite this increase, there were individual cities which checked this advance and even turned it into a retreat. Last year the combined record of all the cities having local safety councils and public accident prevention campaigns showed an increase on only about two per cent, while the total of other cities not having such campaigns showed an increase of twelve per cent. Similarly, in industries, where there are no safety endeavors, the accident problem is still as serious or more serious than it was ten or twenty years ago.


COMPARATIVE COSTS OF OIL AND GAS FOR HOUSE HEATING.
BTU PER GALLON OF OIL
GRAVITY OF OIL
GAS RATE DOLLARS PER 1000 CU FT.
COST OF GAS DOLLARS
CUBIC FEET OF GAS
BTU PER CU FT GAS
GALLONS OF OIL
COST OF OIL, DOLLARS.
EFFICIENCY OF OIL REFERRED TO GAS
PRICE OF OIL, CENTS PER GALLON
EXAMPLE
ASSUME—HEATING-RATE OF GAS $ .55 / 1000 CU. FT.-GAS CONSUMPTION 500 CU FT / DAY-HEAT VALUE OF GAS 550 B.T.U. / CU. FT OIL 70 % AS EFFICIENT AS GAS-GRAVITY OF OIL 38° A.P.I. - PRICE OF OIL $.12 / GAL.- HOW MUCH OIL AND WHAT COST TO EQUAL THE GAS? DRAW LINE FROM $ .55 ON A TO 500 CU. FT. ON B-THE LINE CROSSES C AT $.275, THE COST OF THE GAS.- DRAW LINE FROM 500 CU. FT ON B TO 550 B.T.U. / CU. FT. ON D.- FROM WHERE THIS LINE CROSSES E DRAW LINE TO 70 % ON F- FROM 38° ON H DRAW A LINE THRU THE POINT WHERE THE LAST LINE CUT G.- WHERE THIS LINE CUTS I,-AT 2.9 GALS.-IS GIVEN THE GALLONS OF OIL NECESSARY TO EQUAL 500 CU FT. OF GAS UNDER THE GIVEN CONDITIONS.-A STRAIGHT LINE FROM 2.9 ON I TO $.12 ON J CUTS K AT $ .34 THE COST OF THE OIL.

Courtesy Pittsburgh Equitable Meter Co.

Handy chart for calculating comparative costs of oil and gas for house heating.

THE KOMPAK CO.

Automatic Thermostatic Gas Water Heaters

NEW BRUNSWICK
NEW JERSEY

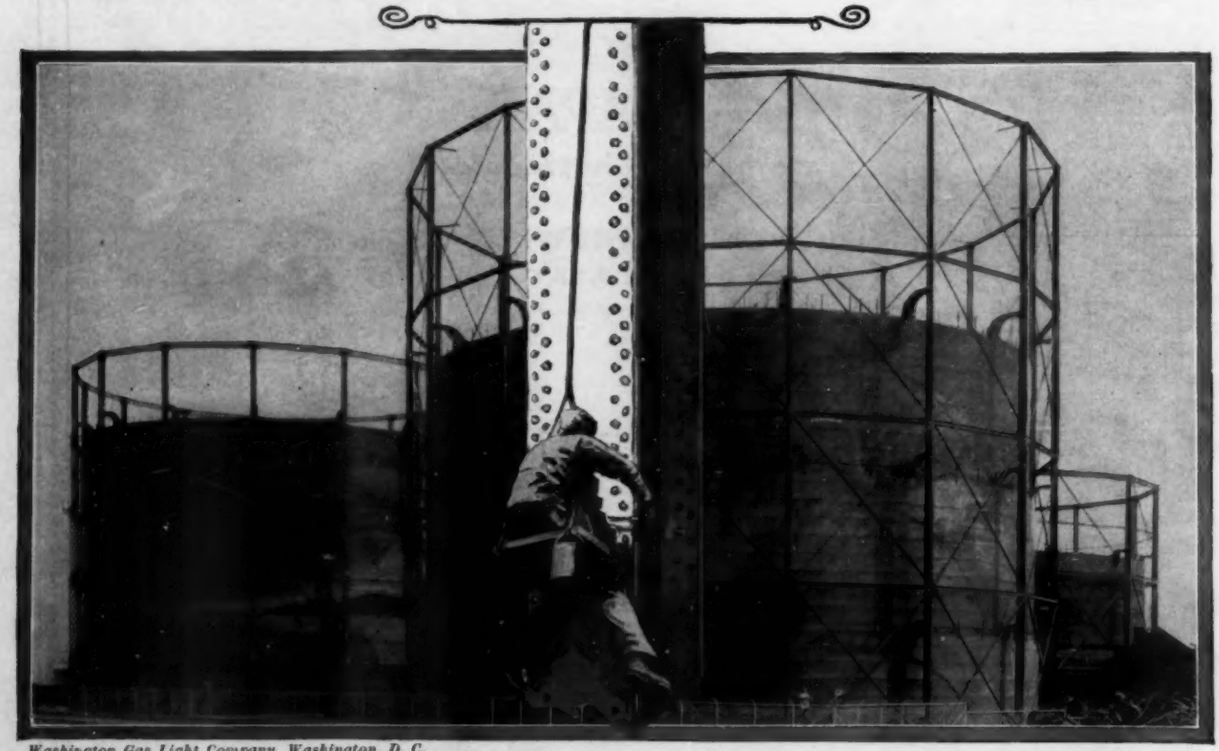
Why Not Try This New Kompak Burner for Some Large Water Heater Job?

We Will Furnish the Burner on Free Trial

$15.00 or $20.00 will install a burner in a coal water heater for large buildings, in many cases yielding a revenue of $35.00 to $100.00 a month. It would cost many times that amount to install a complete new water heater.

Here is your chance to secure some large volume water heating at small expense. Write us for complete information.

SERVICE DATA FOR PROTECTIVE PAINT USERS - - - - - - - CASE NO. 7



Washington Gas Light Company, Washington, D. C.

For severe service conditions, these gas producers use Dixon's **PAINT**—

AND, they have used it in quantities for years. Shown above are three of their gas holders recently painted with Dixon's Silica-Graphite Paint, and Dixon's Aluminum-Graphite Paint. The size of these jobs can be better understood when we consider that these holders have a capacity of 2,000,000 cu. ft. 2,500,000 cu. ft., and 3,000,000 cu. ft. respectively.

The selection of Dixon's Paint for this service is no accident. The Washington Gas Light Company knows from experience that extremes of weather conditions combined with the destructive gases invariably found around gas holders requires a special kind of paint. They know, too, from experience that Dixon's, both the Silica-Graphite and Aluminum-Graphite Paints offer ideal protective coatings for this type of severe service.

The experience of the Washington Gas Light Company is the same as thousands of other industrial plants, railroads, chemical works, and the like who have used Dixon's Paints for years to protect their iron, steel and wooden structures from costly rust, corrosion, and process deterioration conditions.

Every time you buy cheap paint you add to your painting costs

This is true because two thirds of the cost of an industrial paint job is labor cost. And when you "save" a few cents a gallon on paint you have the big labor cost of repainting long before it is properly due. Write for Booklet No. B-2311

JOSEPH DIXON CRUCIBLE COMPANY
JERSEY CITY, NEW JERSEY
Established 1827

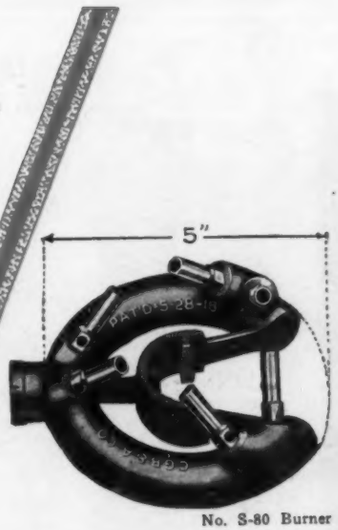
D X N TRADE MARK

DIXON'S SILICA GRAPHITE PAINT

Adequate Protection at Minimum Ultimate Cost

No. S-15 Burner

No. Y-10 Burner



No. S-80 Burner

BARBER PATENTED JET GAS BURNERS

Stimulate the sale of gas heating appliances

Years of dependable and efficient service have built up a powerful trade demand and consumer acceptance for Barber Burner equipped Water Heaters—and other Gas Appliances. They are the Gas Industry's outstanding gas burner—and appliances equipped with them sell about twice as fast as those equipped with ordinary burners.

Standardizing Barber Burners means quicker sales, greater profits, and an absolute minimum of service troubles.

TO MANUFACTURERS: The services of our Engineering Department and Testing Laboratory are at your disposal for determining the correct application of Barber Burners to any type of heating device. Write us today.

Among the many Manufacturers who have adopted Barber Burners as standard in their Water Heaters and other Appliances are the following:

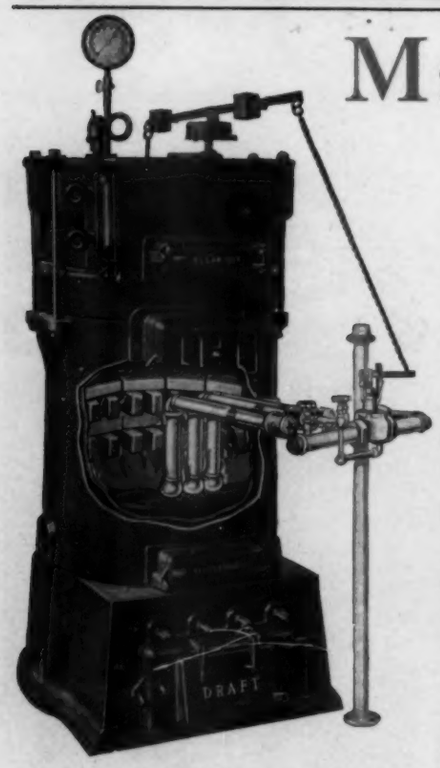
Akron Equipment Co.
American Radiator Co.
Arthur & Fowler Co.
Bean Spray Pump Co.
Bryan Steam Corp.
Carrier Engineering Corp.
Carrier-Lyle Corp.
Champion Dish Washing Machine Co.
Coast Heater Mfg. Co.
Cole Mfg. Co.
Dahlquist Mfg. Co.
Day & Night Water Heater Co.
Economy Heater Co.
Electro Weld Co.
Firestone Tire & Rubber Co.
Franklin Plumbing Supply Co.
R. E. Fraser & Co.
General Gas Furnace Co.
Geneva Heater Co.
Gewert Mfg. Co.
E. A. Hibbs
Hoffman Heater Co.
Hollywood Water Heater Co.
Hotstream Heater Co.
Hoyt Heater Co.
Edward Katzinger Co.
Lovekin Water Heater Co.
Marlow Manufacturing Co.
McCann-Harrison Co.
Merit Mfg. Co.
Walter Mork Co.
Newell Manufacturing Co.
New Way Mfg. Co.
Northwestern Steel & Iron Works
Ohio Heater Co.
Geo. F. Reichman & Co.
Safety Water Heater Co.
Sands Mfg. Co.
Schwab Boiler & Machine Co.
Snap-O-Stat Co.
Star Dee Water Heater Co.
Stinson Sales Co., Inc.
John Trageser Steam Copper Works
United Heater Corp.
Vernon Edler Corp.
Ward Heater Co.
Weil-McLain Co.
Weisbach Co.
D. D. Wessels & Sons Co.
Williams Foundry Machine Co.
Wise Furnace Co.

GAS COMPANIES: Build your house heating load by converting coal-burning boilers and furnaces into efficient gas heaters with Barber CONVERSION Burners.

The CLEVELAND GAS BURNER & APPLIANCE CO.

Burner Specialists

3702-04 Superior Avenue, Cleveland, Ohio



1928 Franklin Applied to a House Heating Boiler

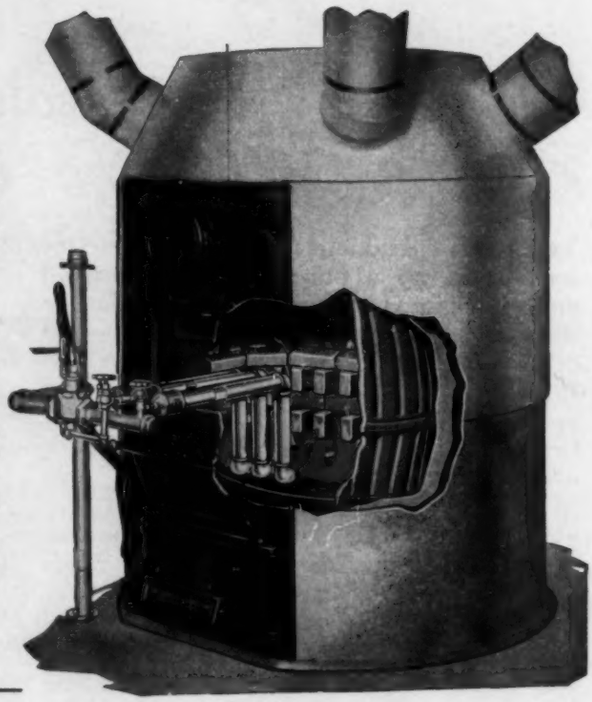
Make it "Sooner"!

"Every coal burning house-heating boiler is today a temporary installation, to be replaced sooner or later by a gas burning appliance."

Bernard J. Mullaney, Vice-President
Peoples Gas Light & Coke Co., Chicago

Your house-heating load curve will climb steadily upward and your appliance sales will show a decided increase, thus realizing *sooner* the prediction quoted above, if you feature

The New 1928 Improved
FRANKLIN
Gas Burner



1928 Franklin Gas Burner Applied to Hot Air Furnace

You can recommend Franklin Burners with the utmost confidence in their ability to not only meet all requirements for converting any coal stoked furnace or boiler into an efficient and economical gas-heating system, but also enable the householder to install them without undue strain on his pocketbook.

Franklins represent the very last word in modern methods used in the proper combustion of gases, gleaned from an experience in this specific line extending over many years.

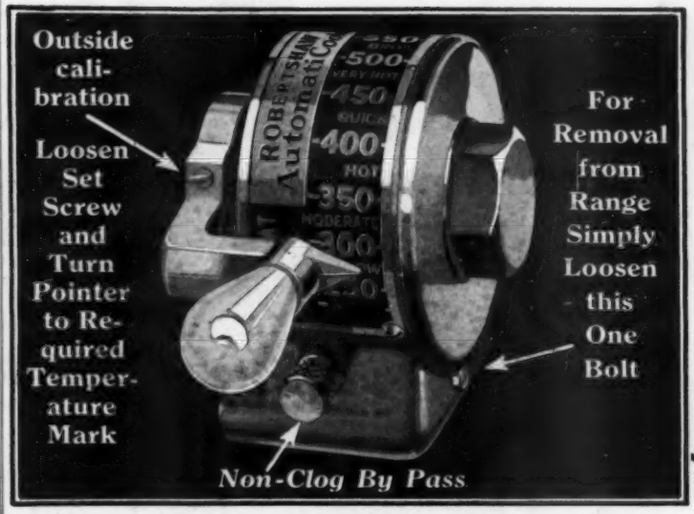
Automatic regulation of air assures intense blue flame under all conditions. Burns natural or artificial gas or their combination. Flame will not extinguish on low pressure. No backfiring in the mixer. Approved by the fire insurance companies. Over 200,000 Franklin Burners of all types are now in use in many parts of the country, which proves their merit.

Boost the New 1928 FRANKLIN GAS BURNER— and Your Profits too!

Patented and Manufactured Exclusively by

THE FRANKLIN GAS APPLIANCE COMPANY
Cincinnati, Ohio

GAS COMPANIES and STOVE DEALERS



Appreciate the Exclusive Advantages of the "B" Type

ROBERTSHAW AutomatiCook

Outside Calibration. Takes just a few seconds to change the temperature setting if required, by means of a convenient set-screw on the temperature pointer. Merely loosen the set-screw, move the pointer to the proper temperature mark on the dial, and then tighten the set-screw.

Quick Removal. Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Requires no mechanical servicing or repairs on the job. Simply loosen one bolt, replace the Thermostat with a spare and tighten the bolt. The job can be done in less than a minute's time.

Non Clog By-Pass Pilot. Will not clog nor bind. Always moves freely and maintains its adjustment. Eliminates servicing, adjusted by turning either to the right or left.

Non-Corrosive Valve Seat. The AutomatiCook is now being equipped with a Raised Non-Corrosive Valve Seat which will resist the corrosive action of gas, eliminating any possible trouble from this source.

Write for 8-Page Folder, illustrating and describing the above advantageous features.

ROBERTSHAW THERMOSTAT CO.

Youngwood, Penna.

The Robertshaw AutomatiCook is now used on more than 80 leading makes of Gas Ranges

Free! a Text Book on Gas making

This valuable manual will be sent to you without charge or obligation.

It tells, in plain language, how coal and water gas are made. Explains how to save in cost of labor and materials. Tells how to locate where trouble exists. Shows plans for laying out a typical gas plant. Tells how to control all the important operations in the plant.

It is a veritable little encyclopedia on the subject of gas making. No matter whether you are the superintendent, engineer or the president of a gas works, you will find this a most interesting and instructive text book.

Write for questionnaire to be filled out for your free copy, or simply mail the coupon. The edition is limited and the regular price is $1.00. So write at once.

CONSOLIDATED ASHCROFT HANCOCK CO. INC.
AMERICAN SCHAEFFER & BUDENBERG DIVISION
338 Berry Street Brooklyn, N.Y.

Consolidated Ashcroft Hancock Co., Inc.,
American Schaeffer & Budenberg Corp. Div.,
338 Berry St., Brooklyn, N. Y.

Kindly send me a questionnaire for free copy of your manual No. 7, "Manufactured Gas."

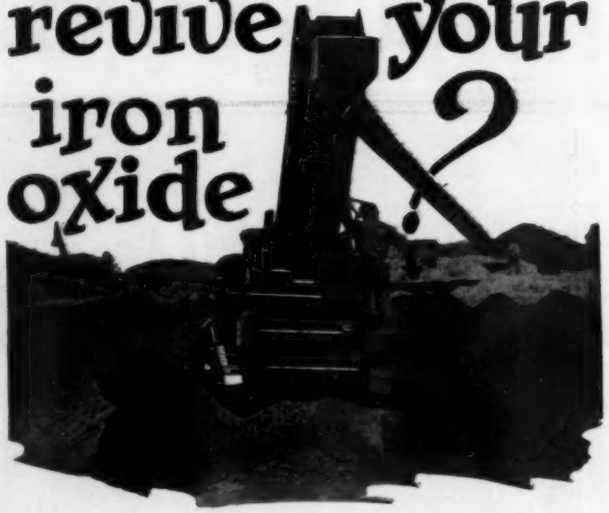
Name .....

Company .....

Address .....

Town ..... State .....

How do You revive your iron oxide?

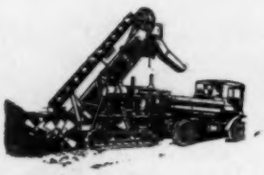


A number of Companies have found it a great economy to use a Haiss Loader for turning over their material—both in making and reviving it.

One of the biggest of them (whose operation is pictured) has been a Haiss Loader user for a number of years—and with evident satisfaction.

A one-man operation—the Loader digs, mixes and restacks the oxide without any hand shoveling. Mechanically, the Haiss machine measures up to the highest standards of simplicity, strength and wear resistance.

Can we tell you more about this machine? Let us send Catalog 527



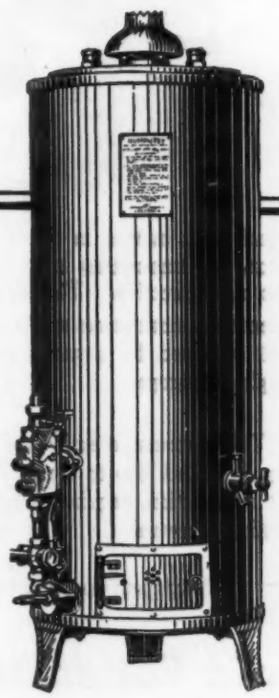
George Haiss Manufacturing Co., Inc.
Park Ave. & 141st Street
New York, N. Y.

HAISS

THE GREATEST OBSTACLE IN THE SALE OF AUTOMATIC GAS WATER HEATERS IS THE COST OF OPERATION PER MONTH... BUT EVEN THAT IS OVERCOME BY THE HIGH

efficiency

OF THE HUMPHREY



Ask your appliance salesmen the biggest obstacle they have to overcome in the sale of Automatic Gas Water Heaters and they'll tell you it is the monthly cost of operation.

Your customers are much more interested in operating cost than in first cost, and rightly so, for first cost comes but once, while operating cost goes on forever.

But when you explain to them how the Humphrey snap action thermostat saves gas—how the insulation retains the heat—how the new method of heating uses every bit of the heat from the gas burned and reduces the monthly operating cost to the minimum, that obstacle is quickly overcome. They will readily see that, although the Humphrey costs a little more to buy—it is vastly cheaper to own. Ask about Humphrey advertising and sales cooperation, it is important to you.

HUMPHREY
AUTOMATIC GAS WATER HEATER

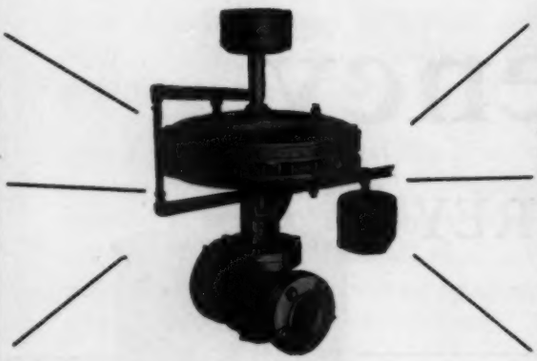
A TYPE AND SIZE FOR EVERY PURPOSE AND PURSE

HUMPHREY COMPANY DIV. RUUD MFG. CO. **KALAMAZOO, MICHIGAN**

Unusually Sensitive Control for High Pressure Gas Transmission

The Fulton Duplex Sensitive Gas Governor is designed to meet the needs of manufactured or natural gas companies who desire to control a high and varying inlet pressure and reduce it to a low and unvarying outlet pressure for illuminating or fuel purposes.

The power to operate this governor is derived from two diaphragms of



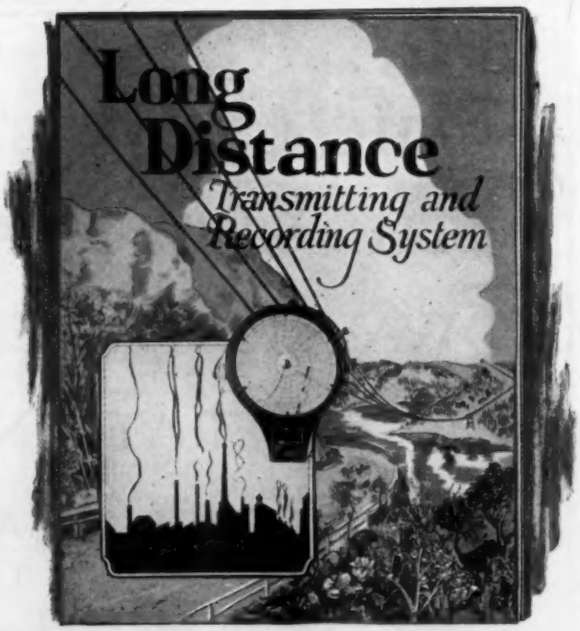
equal area, moving in opposite directions, but transmitting their power in the same direction. This gives a vast increase in sensitiveness and power over that possessed by a governor with a single diaphragm.

The governor is easily and quickly installed, and, due to the simplicity of its construction, requires but little attention afterward.

Catalogue on request

Chaplin-Fulton Mfg. Co.

28-40 Penn Ave., Pittsburgh, Pa.

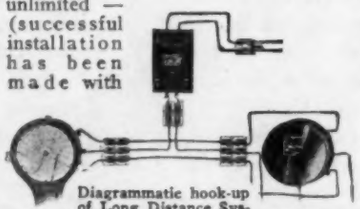


New Bristol's Catalog

gives interesting story of how Long Distance System centralizes operating information at the point of control.

The full benefit of using Bristol's Long Distance Transmitting and Recording System is better realized when one considers the instant contact it gives with operating conditions in all parts of the plant or system. In gas distribution for example, the transmitting unit is installed at outlying sections such as holders at ends of branch mains, booster stations, on high pressure mains, at plants of large industrial consumers, etc., and the Receiving Recorder conveniently mounted in some location where pressure fluctuations at all these points can be watched constantly. The distance over which such pressure records can be transmitted is practically unlimited — (successful installation has been made with transmitting and receiving units eighteen miles apart.) How Bristol's Long Distance equipment is being used to advantage in many industrial plants, utility systems, etc., is described fully in new catalog No. 1900, pictures above. Also included is complete listing of Indicating and Recording Instrument models which can be furnished—full size chart reproduction with actual records taken in field service—listing of charts in various ranges for use with Long Distance Systems—diagrams illustrating different methods of hook-up possible, etc., etc.

A copy of Catalog No. 1900 will be mailed to any interested person in your plant. Send us name and address. You should feel free to call upon Bristol's Engineering Service for any information or other aid needed in adapting Bristol's Equipment to the particular requirements of your plant. There's no obligation.



Diagrammatic hook-up of Long Distance System for Pressure. Left: Indicating Transmitter; right: Recording Transmitter.

The Bristol Company

Waterbury, Connecticut

STYLE

The illustration here shows how appropriately the Homestead "Coalfire" fits in with the early New England setting. No other fire, except a Homestead "Woodfire," would be as attractive as well as utilitarian

Style dominates the sale of most of the merchandise used in the home. Articles that keep pace with the modern Style trend will invariably win over those which do not. This applies to fireplace heaters as well as to other home decorations and utilities; as has been evidenced by the increasing demand for

"HOMESTEAD FIRES"

which not only possess all the heat-giving value of the best radiant heater, but are the most appropriate fireplace decoration because their outstanding feature is

STYLE

Our new portfolio showing the complete line will be sent to New Business and Commercial Managers requesting same on their official stationery.

HOMESTEAD HEATER COMPANY, Inc.

Selvage Street and Fabyan Place WALTER KENNEDY, PRESIDENT **Newark, N. J., U.S.A.**

To The Industrial Sales Manager:-

THE American Gas Association stresses the necessity of improving the efficiency of existing industrial gas installations to meet increasing competition.

The installation of the

IMPROVED KEMP SYSTEM

on a performance basis is often the answer to this problem.

May we tell you about it?

Write, 'phone or telegraph.

The C.M. KEMP Mfg. Co.

Baltimore, Md.

Tycos Gas Leak Indicators

Are a quick and efficient means of locating gas leaks. As soon as the gauges show a leak somewhere along the line, it may be traced by driving small holes along the main and using one of these Indicators. The hand will indicate the place of greatest flow and the leak may be then fixed.
Instruments indicate the presence of either heavy or light gas.

TYCOS Gas Leak Indicator No. 3405

Comes completely equipped in sole leather carrying case with strap, weight about 1¾ pounds.

TYCOS Gas Leak Indicator (Vertical form)

Improved type, vertical form. In sole leather carrying case with strap, weight about 1¾-pounds.

Write for additional information and TYCOS Gas Catalog.

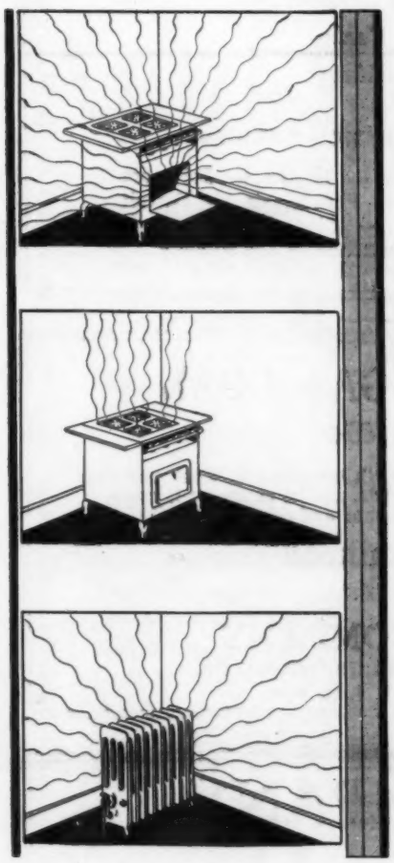
Taylor Instrument Companies

Rochester, N. Y., U. S. A.

Canadian Plant
Tycos Building
Toronto

Manufacturing Distributors
in Great Britain
Short & Mason, Ltd., London

Why does the housewife light the oven to warm a cold kitchen?



YES, why not light the *top* burners instead of the *oven*? At first thought that would seem better. But, it's not so much the amount of heat given off — but where it goes — *the distribution*—that really counts.

In a like manner, Clow Gasteam Radiators may even give off less B. T. U.'s than the "searchlight" scorching type of heater. Yet, Clow Gasteam heats the room more thoroughly.

Clow Gasteam Radiators start radiating the heat right near the floor, and keep on doing so—warming the whole room. Heat from them won't scoot up near the ceiling, slighting the lower portions of the room, as in the small, high temperature heating unit.

That's why Clow Gasteam is making a better job of heating—and, is making better incomes for gas companies. Have a look at our new catalogue.

JAMES B. CLOW & SONS
201-299 North Talman Avenue
Chicago

CLOW GASTEAM

A.G.A. Approved. Listed and Inspected by Underwriters' Laboratories

STOCKED IN EVERY SECTION OF THE COUNTRY

Byllesby Engineering and Management Corporation

BYLLESBY
PIONEERS IN PUBLIC SERVICE
ENGINEERING FINANCE MANAGEMENT

CHICAGO NEW YORK

Pittsburgh San Francisco

RITER-CONLEY CO.
STEEL CONSTRUCTION
PITTSBURGH

STEEL PLATEWORK
FOR
THE GAS INDUSTRY

Gas Holders
Pressure Tanks
Steel Pipe
Steel Barges
Oil Tanks
Purifiers

BRANCH OFFICES
New York — Boston — Baltimore
Chicago — Philadelphia — Detroit
Cleveland — Cincinnati — Seattle
San Francisco — Los Angeles

WESTMORELAND "CRITERION" GAS COAL
The Standard for Gas Making Since 1854

Since this Company commenced operations, its well-known Westmoreland "Criterion" Gas Coal has been largely used by the Gas Companies of Northeastern United States and Canada, and its character is established as having no superior in gas giving qualities and freedom from sulphur and other impurities.

Mines situated on the Pennsylvania Railroad.
in Westmoreland County, Pa.

THE WESTMORELAND COAL COMPANY
Principal Office, Lewis Building, 15th and Locust Sts., Philadelphia, Pa.
Shipping Ports: Philadelphia, Baltimore, South Amboy, N. J., Lake Ports.

ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P C

Manufacturers of All Kinds of Gas Apparatus

NEWARK NEW JERSEY

It's the new ROPER Auto-Slide Broiler Range

—a sure-fire sales-winner because of its particular advantage to every housewife. Notice, in the picture, how this new Roper Broiler automatically rolls the Broiler Rack and Pan out of the lower oven when the door is opened —simplifies cooking—places the Broiler Pan where the meat or toast can be turned easily—without danger of burned hands or arms.

CASH IN ON ROPER FEATURES

Think of the advantages you'll have with this new Roper Gas Range! The Roper Auto-Slide Broiler, Ventilated Oven, Complete Oven Control, the beautiful white porcelain base band, invisible bolts, hinges and door catches, porcelain enamel oven linings, oven door cooking chart—all these features appeal to your customers. Make the Roper Auto-Slide Broiler Range a real source of profit for you.

TAKE ADVANTAGE OF ROPER'S RADIO BROADCAST

This unique broadcasting program is being conducted by the Forecast School of Cookery — an internationally recognized authority on cooking. The Broadcasts are given over the blue network, three times a week for a period of seven months. 51,000,000 people live in the territory covered by this broadcast. The joy of home cooking is being sold to the housewife. The story of cooking is being told from a new angle — the health angle. Play up this cooking school program in your newspaper advertising and cash in on the benefits it will bring you. It is selling gas as the proper cooking fuel. It is Roper's contribution to the cause of gas.

GEO. D. ROPER CORPORATION
Rockford, Illinois

ROPER
GAS RANGES
RADIANT HEATERS—GAS FIRED FURNACES

BE SURE THE ROPER PURPLE ═ AND THE ROPER COMPLETE OVEN CONTROL ARE ON THE GAS RANGE YOU SELL

How many gas men know what causes PEAK LOADS?

Several large gas companies confronted with the sharp peak load problems have made expensive surveys to solve the cross word puzzle. Every survey has placed the blame for sharp peak loads on gas used in fire places and space heaters. Trying to help out inefficient coal fires on cold days to heat certain rooms makes sharp peak loads. In every survey the efficiency of the Roberts Controlled Gas Heating Unit in the central house heating plant has pulled a steady consumption of gas. This system with its steady load consumption gives you steady profits on the capital your plant represents.

If you want to smooth out sharp peak loads, write us on your letterhead and we will submit our sales proposition.

Most Heat per Dollar!

ROBERTS GAS BURNER CORPORATION
128 West Chippewa Street Buffalo, N. Y.

BAROMETERS

PHILADELPHIA, THE WORKSHOP OF THE WORLD,
has 14,000 Manufacturing Establishments of which
many have World-Wide Reputations.

"PRINCO" STANDARD FORTIN MERCURIAL BAROMETERS

are in World-Wide use because they, too, have a "World-Wide Reputation"

THEY ARE GOOD BAROMETERS
THEY ARE REASONABLE IN PRICE!

For more than a decade they have been made in such manner that they can be shipped safely and successfully wherever there is a common carrier. This has been recognized as an achievement in Barometry.

PRECISION THERMOMETER & INSTRUMENT COMPANY
1439 BRANDYWINE STREET - - - - - PHILADELPHIA, PA.

PARKE SAFETY OVEN SHELVES

Where are the Meals Like Mother used to Cook?

In these modern days the housewife has conveniences that Mother never even dreamed of. Her greatest blessing is the gas range. And yet that "blessing" is not being utilized to its fullest extent, to the detriment of the gas companies cooking load. Why?

One reason is that, in spite of the perfection attained in equipping the modern range with every appliance designed to make cooking, broiling and baking attractive and easy for the housewife, one vital accessory has been sadly neglected—the oven shelves. Burned fingers, blistered arms and hands, soiled clothing and messy ranges and floors when using the regulation oven shelf, have made the housewife lose interest in the home-cooked meal; hence the diversion of the domestic cooking to the factory made meal, the restaurant and the delicatessen.

One helpful way to bring back this valuable load, is to make Mrs. Housewife's duty before her gas range a pleasant and *safe* one, by using Parke Safety Oven Shelves as an attraction either by selling them individually, or by insisting that all gas ranges in future be equipped with them.

Patented June 1, 1926, *and Sept.* 1, 1926

Write at once for further details.

The Parke Safety Oven Shelves remove the danger and discomfort of oven cooking. The patented handle, always cool, permits the shelf to be drawn out of the oven just far enough to give attention to the roast and broil and prevents the spilling of grease on the range or floor and on garments.

There's a big field for the sale of Parke Safety Oven Shelves as a separate unit and also for ranges equipped with them, as they represent the very last word in Safety, Comfort and Convenience to the housewife.

The Parke Safety Oven Shelves have been tested and approved by the Good Housekeeping Institute and the New York Herald-Tribune Institute, Modern Priscilla, besides some of the largest Gas Companies in the East.

WILLIAM PARKE, Inc.

537-549 So. Second St., Camden, N. J.

New York Office: 29 Perry St.

Buyers' Reference Index

See page 113 for advertisements of these products

A. B. C. SELF CLINKERING GRATES
The Western Gas Construction Company.

ACCUMULATORS—STEAM
The Gas Machinery Co.
Ruth's Steam Accumulator Co.
A. O. Smith Corp.
Smoot Engineering Corp.
The Western Gas Construction Company.
United Engineers & Constructors, Inc.

ACETYLENE EQUIPMENT
American Lava Corp.
Alexander Milburn Co.

ACCOUNTING MACHINES
Remington Rand, Inc.

AIR FILTERS
Staynew Filter Corp.

AMMONIA CONCENTRATORS
Bartlett Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA CONCENTRATED LIQUOR PLANTS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

AMMONIA PIPE
National Tube Company.

AMMONIA RECOVERY APPARATUS
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

AMMONIA STILLS
Bartlett-Hayward Co.
Cruse-Kemper Co
The Gas Machinery Co.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA TEST
American Meter Co.

APPRAISALS & INVENTORIES
Stacey Bros. Gas Construction Co.
United Engineers & Constructors, Inc.

APPARATUS
Laboratory Experimental
American Meter Co.
Service
American Meter Co.

ASH STORAGE BINS
C. W. Hunt Co., Inc.
Semet-Solvay Engineering Corp.
Riter-Conley Co.
The Stacey Mfg. Co.

AUDITS
United Engineers & Constructors, Inc.

AUTOMATIC CONTROLS FOR WATER GAS APP.
United Engineers & Constructors, Inc.

AUTOMATIC RAILWAYS
C. W. Hunt Co., Inc.

BACK PRESSURE VALVES
Connelly Iron Sponge & Governor Co.

BACKRUN GAS EQUIPMENT
Semet-Solvay Engineering Corp.

BAGS
Safety Gas Main Stopper Co.

BAROMETERS
Connelly Iron Sponge & Governor Co.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

BELTS
Conveyor and Elevator.
Robins Conveying Belt Co.

BENCHES
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Gas Machinery Co.
The Jersey City Refractories Co., Inc.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BENZOL
Bartlett-Hayward Co.
Carl Still, Inc.
The Koppers Construction Co.

BENZOL RECOVERY PLANTS
Semet-Solvay Engineering Corp.

BLOWERS
Industrial Burner
Connersville Blower Co.
Revivifying
Connersville Blower Co.
Water Gas Set
Connersville Blower Co.

BLOWERS & BOOSTERS
Gas Engineering Co.
The Gas Machinery Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BLUE GAS PLANT
Bartlett-Hayward Co.
Carl Still, Inc.
Gas Engineering Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BOILERS—WASTE HEAT
Bartlett-Hayward Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

BOOKKEEPING MACHINES
Remington Rand, Inc.

BOOSTERS
American Brown.
Boverie Elec. Corp.
Connelly Iron Sponge & Governor Co.
Connersville Blower Co.

BRICK
Fire and Checker
Botfield Refractories Co.
The Gas Machinery Co.
Improved Equipment Co.-Russell Eng. Corp.
The Jersey City Refractories Co., Inc.
United Engineers & Constructors, Inc.
United States Refractories Corp.
Silica
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Company.
United States Refractories Corp.

BRUSHES, PIPE CLEANING
Safety Gas Main Stopper Co.

B. T. U. INDICATORS
Alpha-Lux Co.

BUCKETS—CLAMSHELL
Geo. Haiss Mfg. Co.

BUILDINGS
United Engineers & Constructors, Inc.

BURNERS (Industrial)
American Lava Corp.
The C. M. Kemp Mfg. Co.
Conversion
Cleveland Gas Burner & Appliance Co.
Conversion House Heating
Roberts Gas Burner Corp.
Fuel
Cleveland Gas Burner & Appliance Co.

BY-PRODUCT COKE
Semet-Solvay Co.

BY-PRODUCT PLANTS
Bartlett-Hayward Co.
Carl Still, Inc.
The Gas Machinery Co.
International Coal Carbonization Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
West Gas Improvement Co.

CABLE RAILWAYS
C. W. Hunt Co., Inc.

Alpha-Lux Company.
American Meter Co.
Consolidated Ashcroft Hancock

CALORIMETERS
Co., Inc., American Schaeffer & Budenberg Corp. Div.
John J. Griffin & Company.

CALORIMETER ACCESSORIES
American Meter Co.

CARBONIZATION
The Gas Machinery Co.
Low Temperature
International Coal Carbonization Co.

CARBURETTED WATER GAS
The Western Gas Construction Co.

CARBURETTED WATER GAS PLANTS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.

CARS
C. W. Hunt Co., Inc.

CASINGS, SEAMLESS STEEL
National Tube Co.

CAST IRON PIPE
Bell
Cast Iron Pipe Research Ass'n.
Spigot
Cast Iron Pipe Research Ass'n.

CEMENTS
The Jersey City Refractories Co., Inc.
Quigley Furnace Spec. Co., Inc.
Acid-proof
Botfield Refractories Company.
Joseph Dixon Crucible Company.
Quigley Furnace Spec. Co., Inc.
Firebrick
Botfield Refractories Company.
Improved Equipment-Russell Engineering Corp.
United States Refractories Corp.
High Temperature
Alpha-Lux Company.
Botfield Refractories Company.
Joseph Dixon Crucible Company.
E. J. Lavino & Co.
Quigley Furnace Spec. Co., Inc.
United States Refractories Corp.
Refractory
Botfield Refractories Company.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Co.
Refractory Engineering Corp.
United States Refractories Corp.

CHAMBER OVENS
United Engineers & Constructors, Inc.

CHARGING MACHINERY
Bartlett-Hayward Co.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

CHUTES
Eaton-Kent, Inc.
C. W. Hunt Co., Inc.
Riter-Conley Company.
Robins Conveying Belt Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.

CLAMPS (PIPE)
S. R. Dresser Mfg. Co.

CLOCKS & WATCHES, Stop
American Meter Co.

COALS
Pittsburgh Coal Co.
Westmoreland Coal Co

COAL GAS APPARATUS
Bartlett-Hayward Co.
Carl Still, Inc.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Company.
The Western Gas Construction Company.

COAL & COKE BINS CASTINGS
The Koppers Construction Co.
The Stacey Mfg. Co.

COAL AND COKE HANDLING MACHINERY
Bartlett-Hayward Co.
Dry Quenching Equipment Corp.
Geo. Haiss Mfg. Co.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.
Robins Conveying Belt Co.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.

COAL TAR PRODUCTS
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COAL TUBES
C. W. Hunt Co., Inc.

COCKS
Angle Stove
Kitson Co.
Boiler Drain
Kitson Co.
Hose
Kitson Co.
Meter
American Meter Co.
Kitson Co.
Superior Meter Co.
Service
American Meter Co.
Kitson Co.

COKE CRUSHERS
The Koppers Construction Co.
Robins Conveying Belt Co.

COKE QUENCHING
Dry Quenching Equipment Corp.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COKE RECLAMATION SYSTEMS
C. W. Hunt Co., Inc.

COMPUTERS
Heating Value
United Engineers & Constructors, Inc.

CONDENSERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
High Duty
Stacey Bros. Gas Const. Co.
United Engineers & Constructors, Inc.

CONTRACTORS' TUBS
C. W. Hunt Co., Inc.

CONTROLS
The Bristol Company.
Robertshaw Thermostat Co.
Combustion
Smoot Engineering Corp.
Gas Pressure
Smoot Engineering Corp.
Gas Producer
Smoot Engineering Corp.
Hot Water Heat System
The Cleveland Heater Company.
Water Gas Machine
Smoot Engineering Corp.

CONVEYORS
Geo. Haiss Mfg. Co.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.
Robins Conveying Belt Co.

CONCENTRATORS, AMMONIA
(See Ammonia Concentrators.)
Bartlett-Hayward Co.
Isbell-Porter Company.
The Stacey Mfg. Co.

COOLERS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.
Air
Andale Company.
Ammonia Liquor
Andale Company.
Gas
Andale Company.
Oil
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Bartlett-Hayward Co.
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National Tube Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Victualic Co. of Amer.

COUPLINGS—FLEXIBLE
The P. H. & F. M. Roots Company.

CRUCIBLES
Joseph Dixon Crucible Company.

CRUSHERS
Riter-Conley Company.

CUBIC FOOT BOTTLES
American Meter Co.
Lambert Meter Co.

DE-EMULSIFIERS
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

DEHYDRATORS, GAS
Andale Company.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.
The Western Gas Construction Company.

DEMONSTRATION METERS
Lambert Meter Co.

DIAPHRAGMS
Lambert Meter Co.
(Meter)
American Meter Co.

DISCHARGING MACHINERY
Bartlett-Hayward Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.

DRAFT GAUGES
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

ELECTRIC LOCOMOTIVES
C. W. Hunt Co., Inc.

ELEVATORS
C. W. Hunt Co., Inc.
Craig Ridgway & Son Co.
Robins Conveying Belt Co.

ENGINE INDICATORS
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.

ENGINEERS
American Meter Co.
The Gas Machinery Co.
Combustion
Bartlett-Hayward Co.
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
United Engineers & Constructors, Inc.
Consulting
Bartlett-Hayward Co.
United Engineers & Constructors, Inc.
George H. Waring.
The Western Gas Construction Company.
Contracting
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Company.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
Riter-Conley Company.
Stacey Gros. Gas Const. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.
Distribution
United Engineers & Constructors, Inc.
Measurement
American Meter Co.

EXHAUSTERS
Connersville Blower Co.
The Gas Machinery Co.
Isbell-Porter Company.
The P. H. & F. M. Roots Company.
The Western Gas Construction Company.

EXPANSION BENDS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

FILES (Steel and Wood)
Remington Rand, Inc.

FILES (Visible)
Remington Rand, Inc.

FILTERS, Gas
American Meter Co.

FIREBRICK, CEMENT
Quigley Furnace Specialties Co., Inc.

FIREBRICK CHECKER BRICK
(See Brick)
Botfield Refractories Company.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
The Jersey City Refractories Co., Inc.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

FIRST AID EQUIPMENT
United Engineers & Constructors, Inc.

FITTINGS
James B. Clow & Sons.
Isbell-Porter Company.
Kitson Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
U. S. Cast Iron Pipe and Foundry Co.
The Western Gas Construction Company.
Plain End and Flanged
Cast Iron Pipe Research Association.

FIXTURES
American Lava Corp.
General Gas Light Co.

FLOORS, IRON, BRICK, AND STEEL
The Gas Machinery Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

FLOW METERS
Lambert Meter Co.

FLUE PIPE (Cast Iron Oval)
James B. Clow & Sons.
Semet-Solvay Engineering Corp.

FLUES (Consuming) for Gas Range
Akme Flue, Inc.

FURNACES
James B. Clow & Sons.
Gas Fired
The C. M. Kemp Mfg. Co.
Gas Soldering
American Meter Co.

GAS ANALYSIS APPARATUS
Metric Metal Works.

GASKETS
American Meter Co.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Pittsburgh Equitable Meter Co.

GAS COAL
Pittsburgh Coal Co.
Westmoreland Coal Co.

GASOMETERS (Test)
American Meter Co.

GAS PLANTS, COMPLETE
Carl Still, Inc.
Gas Engineering Co.
Isbell-Porter Company.
United Engineers & Constructors, Inc.
West Gas Improvement Co.

GASSING MACHINE
American Meter Co.
Lambert Meter Co.

GAS TAPE
Connelly Iron Sponge & Governor Co.

GAS TESTING APPARATUS
Metric Metal Works.

GATES—WIND & BLAST
The P. H. & F. M. Roots Company.

GAUGE BOARDS
The Bristol Company.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

GAUGES
American Meter Co.
The Bristol Company.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
Maryland Meter Co.
Metric Metal Works.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Taylor Instrument Companies.
The Western Gas Construction Company.
Mercury
Precision Thermometer & Instrument Company.
Pressure-Recording
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
D. McDonald & Co.
Precision Thermometer & Instrument Company.
Siphon
Precision Thermometer & Instrument Company.
Tank
Precision Thermometer & Instrument Company.
Water
Precision Thermometer & Instrument Company.

GENERATORS, Oxygen & Acetylene
Alexander Milburn Co.

GLOVES
Rubber
Safety Gas Main Stopper Co.

GOVERNORS
Pittsburgh Equitable Meter Co.
Automatic
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.

GOVERNORS (Calorimeter and Double Dry)
American Meter Co.
Coke Oven
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
District
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Helme & McIlhenny.
Isbell-Porter Co.
Smoot Engineering Corp.
Exhauster
Connelly Iron Sponge & Governor Co.
Connersville Blower Co.
The Gas Machinery Co.
Isbell-Porter Co.
The P. H. & F. M. Roots Company.
Smoot Engineering Corp.
High Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Laboratory
American Meter Co.
Connelly Iron Sponge & Governor Co.
Lambert Meter Co.
D. McDonald & Co.
Reynolds Gas Regulator Co.
Low Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Lambert Meter Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Retort House
Isbell-Porter Company.
Station
Helme & McIlhenny.

GRAPHITE GRIP GREASES
Joseph Dixon Crucible Company.

GRAPHITE WATER PROOF GREASES
Joseph Dixon Crucible Company.

GRATES for Water Gas Generators
Semet-Solvay Engineering Corp.

GRAVITOMETERS
Precision Thermometer & Instrument Company.

GRIDS, for Scrubbers
Semet-Solvay Engineering Corp.

HEATERS
James B. Clow & Sons.
Feed Water
Andale Company.
House
American Gas Products Corp.
Cleveland Gas Burner & Appliance Co.
The Cleveland Heater Company.
Roberts Gas Burner Corp.
Room
American Gas Products Corp.
American Stove Company.
General Gas Light Co.
Homestead Heater Company.
Welsbach Company.
Water
The Cleveland Heater Company.
Humphrey Company.
Welsbach Company.
Hot Water
Electric Porcelain & Mfg. Co.
Kompak Company.

HIGH CAPACITY METERS
Lambert Meter Co.

HIGH HEAT RESISTING GRAPHITE GREASES
Joseph Dixon Crucible Company.

HIGH PRESSURE PIPE LINES
The Western Gas Construction Company.

HOISTS
The Gas Machinery Co.
Geo. Haiss Mfg. Co., Inc.
C. W. Hunt Co., Inc.
Robins Conveying Belt Co.

HOLDERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
Riter-Conley Company.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.

HOPPERS—COAL AND COKE
Bartlett-Hayward Co.
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
Riter-Conley Company.
Robins Conveying Belt Co.
The Stacey Mfg. Co.

HOTELS
Shelburne Hotel.

HOWARD AUTOMATIC CHARGERS
The Western Gas Construction Company.

HYDROGEN GAS APPARATUS
Bartlett-Hayward Co.
Gas Engineering Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.

HYDROGEN SULPHITE TEST (Apparatus)
American Meter Co.

HYDROMETERS
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

INCINERATORS, GAS-FIRED
Kernit Incinerator Co.

INDUSTRIAL GAS MIXERS
The C. M. Kemp Mfg. Co.
Roberts Gas Burner Corp.
Smoot Engineering Corp.

INDUSTRIAL TRACK
C. W. Hunt Co., Inc.

IRON BORING OXIDE
Gas Purifying Materials Co., Inc.

IRON SPONGE
Connelly Iron Sponge & Governor Co.

INSTRUMENTS
Alpha-Lux Company.
The Bristol Company.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Lambert Meter Co.
Metric Metal Works.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.
Recording
American Meter Co.

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JOINTS (Pipe)
S. R. Dresser Mfg. Co.
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LAMPS
General Gas Light Co.
Welsbach Street Lighting Co.
LAMP POSTS
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LAVA BURNER GRIDS
American Lava Corp.
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LOADERS—BUCKET, PORTABLE
Geo. Haiss Mfg. Co.
LOCKERS
Remington Rand Co.
LOOSE LEAF EQUIPMENT
Remington Rand Co.
LUX MATERIAL
Alpha-Lux Company.
LUX SPONGE
Alpha-Lux Company.
MANILA AND WIRE ROPE
C. W. Hunt Co., Inc.
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Superior Meter Co.
Nathaniel Tufts Meter Works.
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MILLER GRIP PACKING
Connelly Iron Sponge & Governor Co.
MIXERS, GAS
The C. M. Kemp Mfg. Co.
Roberts Gas Burner Corp.
Semet-Solvay Engineering Corp.
Smoot Engineering Corp.
MOISTURE DETERMINATORS
United Engineers & Constructors, Inc.
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Wm. Parke, Inc.
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Connelly Iron Sponge & Governor Co.
Gas Purifying Materials Co., Inc.
E. J. Lavino & Co.
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Lambert Meter Co.
PACKING
Asbestos
Safety Gas Main Stopper Co.
PAINTS
Joseph Dixon Crucible Company.
Safety Gas Main Stopper Co.
The Stacey Mfg. Co.
Wailes Dove-Hermiston Corp.
Metal Protective
Semet-Solvay Co.
PAINTS, ANTI ACID AND ALKALI
Quigley Furnace Spec. Co., Inc.
PAINTS, RUSTPROOF
Quigley Furnace Spec. Co., Inc.
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National Tube Co.
The Stacey Mfg. Co.
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American Meter Co.
Semet-Solvay Engineering Corp.
McWane Cast Iron Pipe Co.
Bell and Spigot
American Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Foundry Co.
Cast Iron
American Cast Iron Pipe Co.
James B. Clow & Sons.
McWane Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Foundry Co.
Centrifugal
American Cast Iron Pipe Co.
Flange
American Cast Iron Pipe Co.
James B. Clow & Sons.
Semet-Solvay Engineering Corp.
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Screw Joint Cast Iron Pipe
McWane Cast Iron Pipe Co.
Seamless Steel
Pittsburgh Steel Products Co.
Spigot
James B. Clow & Sons.
McWane Cast Iron Pipe Co.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
Steel
Bartlett-Hayward Co.
James B. Clow & Sons.
Cruse-Kemper Co.
The Gas Machinery Co.
National Tube Co.
Pittsburgh Steel Products Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
Welded Steel
Bartlett-Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
National Tube Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
PIPE COATINGS
Wailes-Dove-Hermiston Corp.
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Improved Equipment-Russell Engineering Corp.
The Koppers Construction Co.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
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C. W. Hunt Co., Inc.
The Stacey Mfg. Co.
The Western Gas Construction Company.
Floor
Gas Engineering Co.
The Gas Machinery Co.
Riter-Conley Company.
United Engineers & Constructors, Inc.
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Safety Gas Main Stopper Co.
Soft Wood
Safety Gas Main Stopper Co.
PORTABLE TEST METERS
Lambert Meter Co.
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Gas Engineering Co.
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The Stacey Mfg. Co.
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The Western Gas Construction Company.
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American Meter Co.
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American Meter Co.
PROVERS—METER
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Helme & McIlhenny.
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D. McDonald & Co.
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Connersville Blower Co.
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Connersville Blower Co.
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Cruse-Kemper Co.
Gas Engineering Co.
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Isbell-Porter Company.
The Koppers Construction Co.
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and avoid frequent shut-downs with

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R&E

Water Gas

In a 12' Water Gas Set the lining was laid up with R & E 3000 and a wash coating of the same applied to prevent penetration and clinker adherence. After 1500 hours constant severe operation the generator was shut down for inspection. The lining was in excellent condition and the generator was again put in service for another 1500 hours. At the end of 3000 hours, R & E 3000 had established a record for severe duty far beyond any previous experience with other cements. R & E 3000 had saved a big repair charge.

R & E 3000 comes in plastic form ready for immediate use. It can safely be used for construction and patching work where temperatures do not exceed 3000° F. R & E 3000 is shipped in air-tight steel drums, 800 lbs., 500 lbs., and 100 lbs. Full directions on each drum.

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A large coke oven plant is using R & E 3000 to level the floors of the ovens when they become corrugated. Ask us how we did it. We'll gladly tell any coke oven superintendent.

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WEST NEW BRIGHTON, STATEN ISLAND, N. Y.
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See page 113 for advertisements of these products

PURIFYING MATERIALS
Alpha-Lux Company.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Gas Purifying Materials Co., Inc
The Koppers Construction Co.
E. J. Lavino & Co.
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The Gas Machinery Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
PYROMETERS
The Bristol Company.
The Western Gas Construction Company.
Indicating
The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.
Radiation
Taylor Instrument Companies.
Recording
The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.
RADIATORS
Gas Steam
American Gas Products Corp.
James B. Clow & Sons.
Gas Water
James B. Clow & Sons.
RANGES—GAS
American Stove Co.
RECORDING DEMAND METERS
Lambert Meter Co.
REFRACTORY CEMENTS
Botfield Refractories Company
Joseph Dixon Crucible Company
The Gas Machinery Co.
Improved Equipment—Russell Engineering Corp.
E. J. Lavino & Co.
Quigley Furnace Spec. Co. Inc.
Refractory & Engineering Corp.
United States Refractories Corp.
REFRACTORY GUN
Botfield Refractories Company
Quigley Furnace Spec. Co. Inc.
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Botfield Refractories Company
Joseph Dixon Crucible Company.
The Gas Machinery Co.
Improved Equipment—Russell Engineering Corp.
Quigley Furnace Spec. Co. Inc.
United Engineers & Constructors Inc.
The Western Gas Construction Company
United States Refractories Corp.
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American Meter Co.
The Chaplin Fulton Mfg. Co.
Connersville Blower Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Isbell-Porter Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Robertshaw Thermostat Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Taylor Instrument Companies
Air Pressure
Smoot Engineering Corp.
Coke Oven Suction Main
Smoot Engineering Corp.
Exhauster
Smoot Engineering Corp.
Furnace Pressure
Smoot Engineering Corp.
Oven
American Stove Co.
Oxygen & Acetylene
Alexander Milburn Co.
Steam Pressure
Smoot Engineering Corp.
REPAIR PARTS
Lambert Meter Co.
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Connelly Iron Sponge & Governor Co.
RETORTS
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Improved Equipment—Russell Engineering Corp.
Vertical
United Engineers & Constructors Inc.
West Gas Improvement Co.
Silica and Clay
Improved Equipment—Russell Engineering Corp.
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United States Refractories Corp.
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Botfield Refractories Company
Joseph Dixon Crucible Company
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Improved Equipment—Russell Engineer Corp.
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Refractory & Engineering Corp.
United States Refractories Corp.
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Connelly Iron Sponge & Governor Co.
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District
Reynolds Gas Regulator Co.
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Southwestern Pipe Joint & Eng. Co. Inc.
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Remington Rand Inc.
SAFETY VALVES
Connelly Iron Sponge & Governor Co.
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Robins Conveying Belt Co.
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C. W. Hunt Co. Inc.
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Isbell-Porter Co.
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The Stacey Mfg. Co.
West Gas Improvement Co.
The Western Gas Construction Company
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SERVICE CLEANERS
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SERVICE PLUG-RUBBER
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SKIP HOIST
C. W. Hunt Co. Inc.
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American Meter Co.
SPECIFIC GRAVITY GAUGES
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SPONGE
Alpha-Lux Company
Connelly Iron Sponge & Governor Co.
Gas Purifying Materials Co. Inc.
SPRAYS, for Water Gas Machines
Semet-Solvay Engineering Corp.
SPRAYERS, PAINT
Alexander Milburn Co.
STACEY BULLETT for High Pressure Storage
Stacey Bros. Gas Construction Co.
STATION METERS
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
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(See Accumulators—Steam)
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Smoot Engineering Corp.
United Engineers & Constructors Inc.
The Western Gas Construction Company
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Joseph Dixon Crucible Company
STOPPERS
Safety Gas Main Stopper Co.
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Andale Company
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Connelly Iron Sponge & Governor Co.
Safety Gas Main Stopper Co.
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Smoot Engineering Corp.
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Turbo-Generators.
Amer. Brown Boverie Elec. Co.
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Precision Thermometer & Instrument Company.
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TANKS
Bartlett-Hayward Co.
Cruse-Kemper Company.
Gas Engineering Co.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
The Stacey Mfg. Co.
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Stacey Bros. Gas Const. Co.
High Pressure
The Gas Machinery Co.
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The Gas Machinery Co.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.
TAR DISPLACEMENT SYSTEM
The Gas Machinery Co.
TAR EXTRACTORS
Bartlett-Hayward Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.
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American Stove Co.
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Taylor Instrument Companies.
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Seamless Steel
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U GAUGES
American Meter Co.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
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Precision Thermometer & Instrument Company.
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High Pressure Special
Smoot Engineering Corp.
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VALVES—DIAPHRAGM
The P. H. & F. M. Roots Company.
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The P. H. & F. M. Roots Company.
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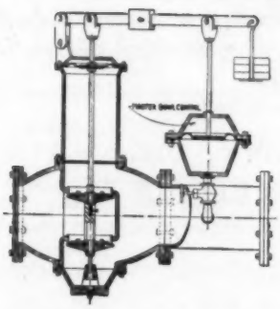

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Stock and Service in every Industrial Center.
"HYTEMPITE" is a Quigley Product.

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Intensely Active. High Total Sulphur Absorption at Minimum Cost.

"THE EFFICIENT PURIFIER"

The Sponge with the large Tough Shavings Always Uniform

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Manufacturers of Gas Production Equipment

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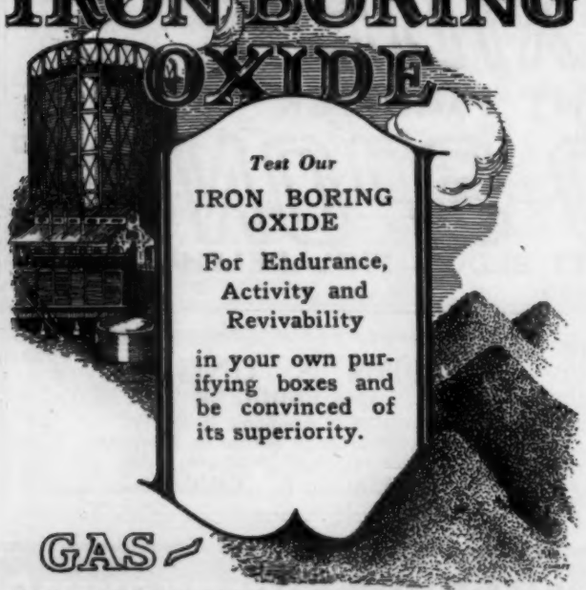
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Vol. 120,

No. 8—Feb. 23, 1924.
No. 9—Mar. 1, 1924.
No. 10—Mar. 8, 1924.
No. 11—Mar. 15, 1924.
No. 15—Apr. 12, 1924.
No. 17—Apr. 26, 1924.
No. 25—June 21, 1924.
No. 26—June 28, 1924.

Vol. 121,

No. 1—July 5, 1924.
No. 2—July 12, 1924.
No. 4—July 26, 1924.
No. 5—Aug. 2, 1924.
No. 6—Aug. 9, 1924.
No. 7—Aug. 17, 1924.
No. 8—Aug. 23, 1924.
No. 14—Oct. 4, 1924.

Also title page and indexes for vols. 120-121-125-127. 1924-26.

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AMERICAN GAS JOURNAL.

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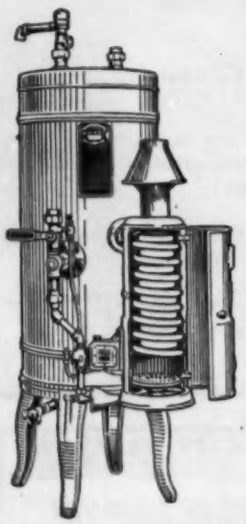

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You owe it to yourself to get the complete details about the Rex Automatic Storage Water Heater line—the water heater that is completely equipped with Safety Patrol Valve, Snap-Action Thermostat, Aluminum Down Draft Diverter, Temperature and Pressure Relief Valve, and a heavy hairfelt covering of the storage tank.

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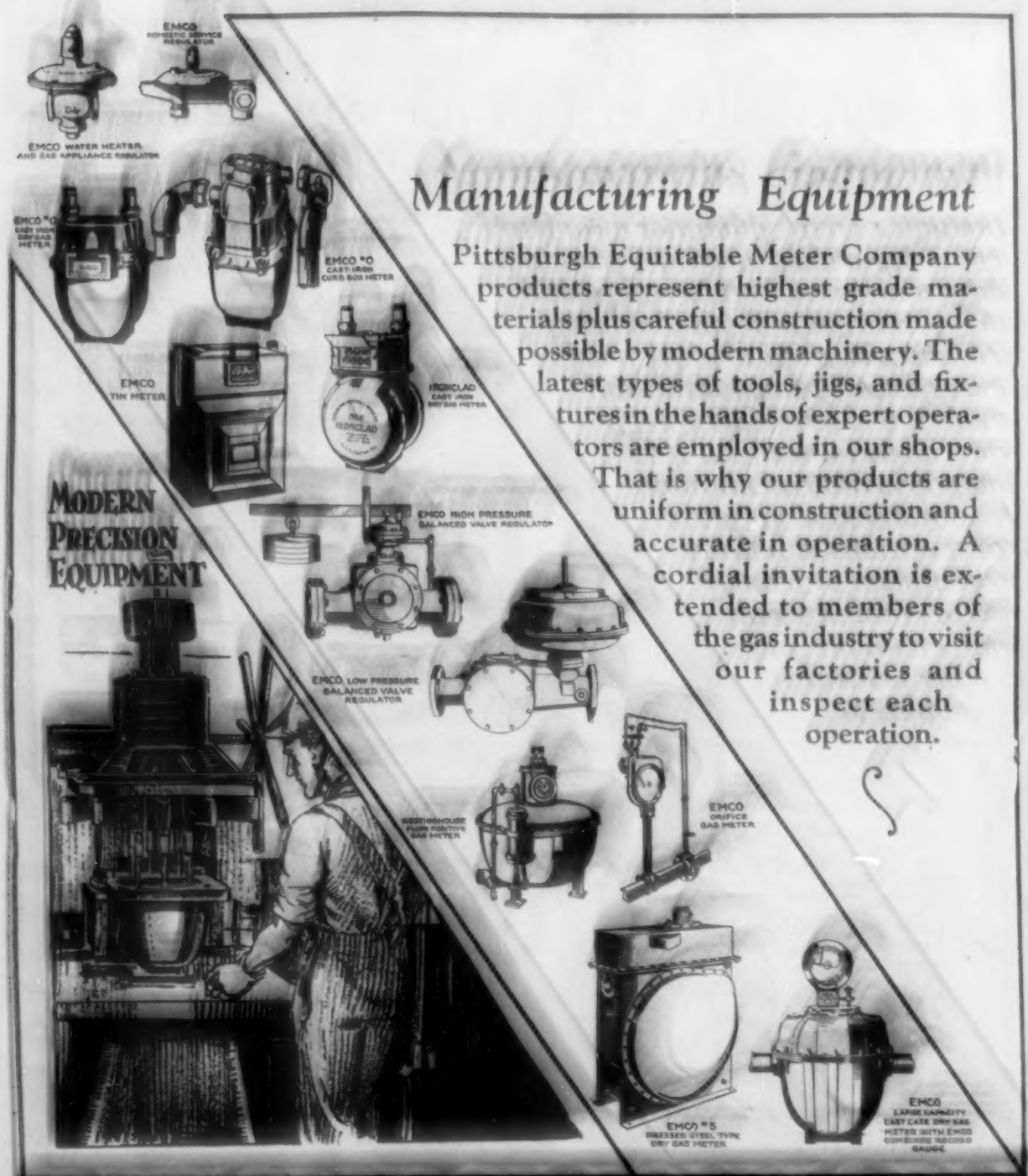
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GAS COAL
First—
it must be chemically
right—low in ash and sulphur
—high in B.T.U.,— with a high fusion
point of ash—and with a volatile percentage
of 32 to 36%.
Second—
it must be firm in structure, fairly uniform in
size—and as clean as modern cleaning machinery
can make it—for dirt means high ash.
Standard Youghiogheny fills every specification—
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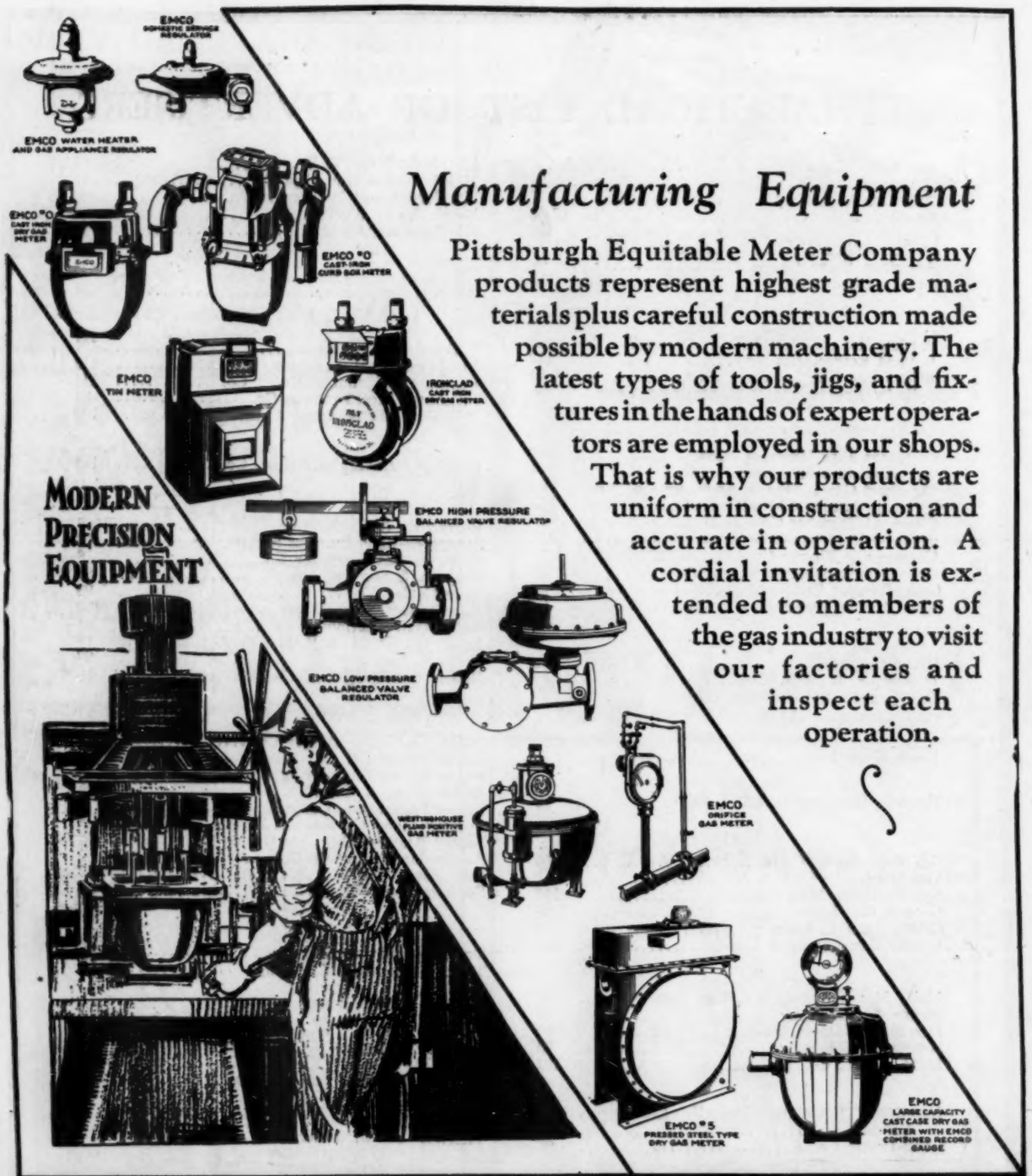
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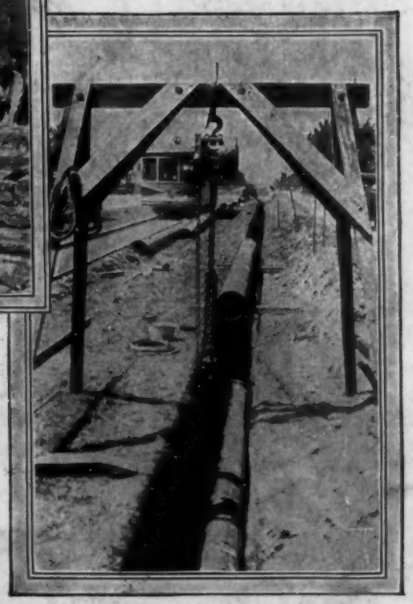
New method reduces pipe laying costs



–Pontiac success widely observed

ENGINEERS and officials of leading mid-western gas companies gathered at Pontiac, Michigan, recently to inspect the laying of a new type main.

Two thousand feet of 12″ multiple length* deLavaud cast iron pipe with Anthony joints was laid in record time despite unusual difficulties in grade crossings and at street intersections.

So much interest was shown in the success and economy of this latest type of cast iron pipe for high-pressure gas and water lines that a brief engineer's report of the work has been prepared. A limited number of copies of this report is available to anyone interested in this most recent development in underground pipe lines.

Photographs and data by courtesy of Consumers Power Co.

Upper left picture shows the simplicity of connecting the Anthony Joint. No special tools or skill required. Center photograph illustrates the ease of handling 24 ft. lengths of deLavaud pipe. Right hand illustration shows the chain hoist used to lower pipe into trench.

*Note: Multiple length deLavaud pipe comes in 24 ft. lengths consisting of two standard 12 ft. lengths bronze welded at the plant under ideal conditions, and shop-tested.

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